

ORDER

FEDERAL AVIATION ADMINISTRATION

1810.4B

10/22/92

SUBJECT: FAA NAS TEST AND EVALUATION POLICY

1. PURPOSE. This order establishes Federal Aviation Administration (FAA) National Airspace System (NAS) Test and Evaluation (T&E) Policy for acquisition programs and is consistent with the Office of Management and Budget (OMB) Circular A-109, Major System Acquisitions.

2. DISTRIBUTION. This order is distributed to the director level in Office of Independent Operational Test and Evaluation Oversight; to the division level of the Office of the Associate Administrator for NAS Development; to the branch level of the Office of the Program Directors for Surveillance, Weather and Flight Service Systems, Communications and Aircraft Acquisition, Navigation and Landing, Automation, and to the Program Manager for Advanced Automation; to the branch level in the Offices of the Associate Administrators for Airway Facilities, Air Traffic, and System Engineering and Development, Flight Standards Service; to the branch level in the regional Air Traffic Division; to section level in the regional Airway Facilities Division; to each Airway Facilities General NAS Sector; to the branch level at the Mike Monroney Aeronautical Center; and to the branch level in the Engineering, Test, and Evaluation Service, the Engineering, Integration, and Operational Evaluation Service, the Engineering, Research, and Development Service and the Resource Management Service at the FAA Technical Center.

3. CANCELLATION. Order 1810.4A, FAA NAS Test and Evaluation Program, dated February 14, 1989, is cancelled.

4. EXPLANATION OF CHANGES

a. This order establishes FAA NAS T&E policy consistent with OMB Circular A-109, Major System Acquisitions; Order DOT 4200.14C, Major Acquisitions; and Order 1810.1E, Major Acquisitions.

b. The Director (ATQ-1) of Independent Operational Test and Evaluation (IOT&E) Oversight will serve as a member of the Test Policy Review Committee (TPRC) for Major Acquisitions (MA's) and subsystems designated for IOT&E oversight and have coapproval authority of FAA Master Test Plans (MTP's) and revisions to FAA MTP's.

c. An appendix 1, with an introduction, table of contents, and seven parts has been added to the order to support implementation of the policy.

5. DEFINITIONS. To facilitate understanding the T&E policy and implementation details contained in the appendix 1, an acronyms list and terms and definitions section have been made most readily available for quick referral in part 1 and 2 of the appendix 1.

Distribution: A-W(TQ)-1; A-W(ND)-2;
A-W(/AF/AP/AT/FS/NA/NC/NN/NR//NW/SD)-3; A-X(AT)-3;
A-X(AF)-4; A-Y-3; A-Z(ET/ER/RM)-3; A-FAF-2(STD)

Initiated By: ASE-600

6. AUTHORITY TO CHANGE THIS ORDER. The Administrator has the authority to approve changes affecting T&E policy. The Associate Administrator for System Engineering & Development is authorized to issue changes to this order which do not change T&E policy, organizational responsibilities, or the conduct of IOT&E oversight.

7. APPLICABILITY. Compliance with this order is mandatory for all NAS acquisition programs developed under the auspices of the Capital Investment Plan (CIP) and Research, Engineering, and Development (RE&D) Plan.

8. TEST AND EVALUATION POLICY. All NAS acquisition programs shall complete the T&E process described in this order. This T&E process ensures the NAS system/subsystem requirements, including operational effectiveness and operational suitability, are verified prior to commissioning and is consistent with OMB Circular A-109, Order DOT 4200.14C, Order 1810.1E, and Order 1810.2, Independent OT&E Oversight.

9. OVERVIEW OF TEST AND EVALUATION PROCESS.

a. The FAA Master Test Plan. The Program Manager (PM) and the Associate Program Manager for Test (APMT) prepare the FAA MTP. The FAA MTP defines the test strategy, test requirement sources, test implementation responsibilities, and presents an overview of Mission Need objectives for all four T&E phases for the program. The FAA MTP further describes the T&E components for meeting program objectives for each acquisition phase. As the program progresses from concept through production phases, the FAA MTP is updated with additional detail. The original FAA MTP and all of its revisions must be approved by the TPRC.

b. Test and Evaluation Phases. T&E phases are identical to the four acquisition phases of a NAS program: concept, demonstration, development and production. Each phase proceeds to the next by meeting specified acquisition milestones (such as Key Decision Points (KDP's) for Major Acquisitions). T&E plays a key role in determining when a program is ready to move on to the next phase. This process is illustrated in figure 1-1 and further explained in the appendix 1, part 4.

(1) Concept Phase. The Mission Need Statement (MNS) begins the Concept phase. This phase compares alternative implementation methodologies and assesses their technical risk. The PM and APMT are appointed at the beginning of this phase.

(2) Demonstration Phase. During this phase requirements are tested using a model. This model is often a scaled down or partial implementation of the subject subsystem. Deficiencies found during the testing of this subsystem are corrected and retested until the subsystem meets requirements.

(3) Development Phase. During this phase requirements are tested using a prototype or limited production version of a subsystem. A Verification Requirements Traceability Matrix (VRTM) is added to the FAA MTP. Appendix 1, part 6, contains additional information on VRTM's.

(4) Production Phase. After the FAA production and deployment decisions for the subsystem, the contractor conducts Production Acceptance Test and Evaluation (PAT&E) and the FAA conducts Field Shakedown at each deployment site.

Figure 1-1. Overview of FAA-WAS Test and Evaluation Process

OMB CIRCULAR A109, MAJOR SYSTEM ACQUISITIONS
 DOT ORDER 4200.14C, MAJOR ACQUISITIONS
 FAA ORDER 1810.1E, MAJOR ACQUISITIONS
 FAA ORDER 1810.2, INDEPENDENT OT&E OVERSIGHT
 FAA ORDER 1810.4B, TEST AND EVALUATION POLICY

Test and Evaluation Phases

For Non-MA's and MA's



ACQUISITION MILESTONES FOR MA's and DESIGNATED SUBSYSTEMS

KDP 1

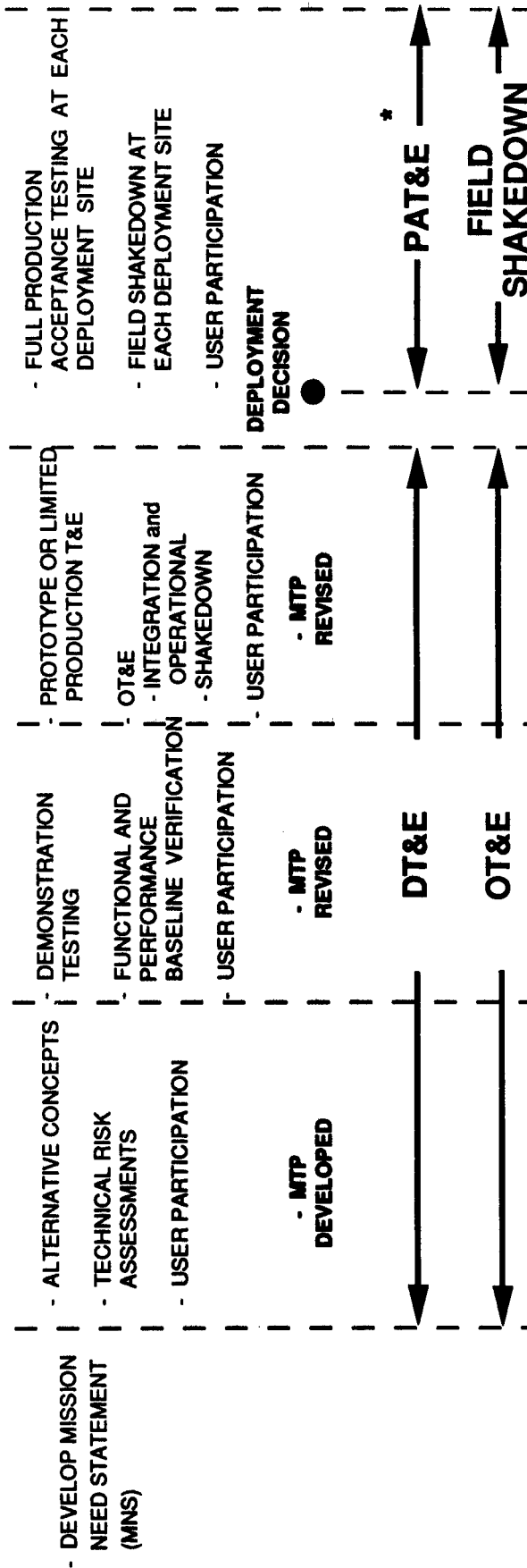
KDP 2

KDP 3

KDP 4

PRODUCTION
DECISION

Independent OT&E Oversight



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Precedes FIELD SHAKEDOWN at each deployment site.

c. Test and Evaluation Components. T&E consists of four components: Development Test and Evaluation (DT&E), OT&E, PAT&E, and Field Shakedown. Selected T&E information in support of the implementation of these T&E components has been provided in appendix 1, part 7.

(1) Development Test and Evaluation. DT&E tests the function and performance of the subsystem to determine if it meets specification. The contractor normally conducts these tests which are witnessed by the FAA. DT&E is more dominant in the early T&E phases, and concludes with acceptance of the subsystem by the FAA in the Development phase. (See figure 1-1.)

(2) Operational Test and Evaluation. OT&E tests the integration, effectiveness, suitability, supportability, and maintainability of the subsystem. It starts at the Concept phase with user participation and continues to the production decision. OT&E as used in this order is comprised of three elements designated Integration, Operational Testing, and Shakedown and is conducted by the FAA. Further descriptions and delineations of these three testing elements have been included in the appendix 1, part 2, and figure 7-1 of part 7.

(3) Production Acceptance Test and Evaluation. PAT&E tests the function of each subsystem produced by the contractor. The contractor conducts PAT&E. It starts at the deployment decision and concludes after acceptance by the FAA at the last deployment site.

(4) Field Shakedown. Field Shakedown is the term used in this policy to define a process whereby the operational readiness of each contractor accepted subsystem (after the PAT&E has been completed at each field deployment site) is demonstrated as a NAS system entity, before its operation as part of the NAS. The Regional Airway Facility and Air Traffic Divisions conduct this system shakedown, when required, by using the system from Initial Operational Capability (IOC) to Operational Readiness Demonstration, building confidence in the system and verifying training and procedures. This activity culminates when the facility Air Traffic manager (for those systems that impact Air Traffic Control (ATC)) makes the final determination of the operational suitability and viability of the NAS system. Reference Order 6030.45, Facility Reference Data File, for more specific details into the requirements and responsibilities.

d. Incremental Implementation of a Subsystem into the NAS. An incremental implementation adds functionality to a fielded subsystem by successive builds or modifications. The program office is responsible for scheduling the increments and testing requirements for each successive build. This additional testing includes DT&E, OT&E, PAT&E, and Field Shakedown.

e. NAS Program System Integration Responsibility. Each PM is responsible for testing the interfaces to pre-existing NAS subsystems. When a program's subsystem interfaces to another subsystem which is not yet part of the NAS, the program must test the interface as much as is practical. This testing typically uses simulation, models or prototypes, and tests the interface to verify that it meets the success criteria defined in the Interface Control Document (ICD). The final subsystem integration is the responsibility of the last program to deploy its subsystem.

f. Non Developmental Items (NDI's). NDI hardware, firmware, and software may exist as previously developed Government or commercial items which may be suitable for NAS subsystem acquisitions. NDI acquisitions that are intended to operate in the same environment for which designed should lead to more reliance on market surveys, item history, and existing test data. An FAA MTP is required for NDI acquisitions. NDI requiring modification or which are intended to operate in a different environment than originally designed may require additional testing in order to verify performance and operational effectiveness and suitability. The PM and the APMT shall determine which FAA test requirements were satisfied through vendor demonstrations and/or test data and what additional testing is required. To accomplish any required additional testing, the PM and APMT will update the FAA MTP to identify additional testing requirements. The FAA MTP will also include the contractor's testing responsibilities for the Production phase (PAT&E).

10. TEST AND EVALUATION RESPONSIBILITIES. The following paragraphs provide primary T&E responsibilities relative to this order. The appendix 1, part 3, provides a finer delineation of responsibilities intended for implementation of this order.

a. Associate Administrator for System Engineering and Development (ASD). Appoints chairperson and secretariat for the TPRC; supports and administers test policy, revisions to test standards and definitions; verifies compliance with this order and related standards using the approved TPRC processes; provides PM's (via ARD) for NAS acquisition programs; jointly prepares the FAA MTP; submits the FAA MTP to the TPRC for approval; directs DT&E testing; provides NAS system level test requirements for inclusion in FAA MTP's; uses configuration management processes to provide traceability to NAS system engineering documentation; and develops VRTM's for the NAS System Specification and NAS Interface Requirements Documents.

b. Associate Administrator for Acquisition Support (ASU). Provides logistics support to the T&E process, including the appointment of contracting officers and quality reliability officers; and ensures that contractual T&E obligations are fulfilled.

c. Associate Administrator for Airway Facilities (AAF). Participates in all phases of the T&E process including the review, approval, and development of program requirements; identifies and develops OT&E Shakedown requirements; directs and conducts OT&E Shakedown; provides PM's for Facility Integration programs; provides T&E assessments to support the Deployment Readiness Review (DRR) process; and provides regional Airway Facilities Divisions personnel to support development of test requirements.

d. Associate Administrator for Air Traffic (AAT). Participates in all phases of the T&E process including the review, approval, and development of program requirements; provides and approves user test requirements and determines the operational acceptability of new ATC operational computer programs or systems; develops the ATC procedures to be used during OT&E and Field Shakedown; provides T&E assessments to support the DRR process; and provides regional Air Traffic Divisions support personnel to PM's in the development of test requirements and in the implementation of T&E requirements.

e. Associate Administrator for Regulation and Certification (AVR). Provides operational expertise in the flight standards area for conducting and analyzing tests; provides support to monitoring and/or conduct of DT&E and PAT&E; provides and approves user test requirements; and evaluates the operational acceptability during OT&E testing.

f. Associate Administrator for NAS Development (AND). Provides PM's for NAS acquisition programs. The PM provides overall management for the NAS program; jointly prepares the FAA MTP; submits the FAA MTP to the TPRC for approval; directs DT&E testing; presents T&E deployment issues to the DRR; and approves Program Directives.

g. Director for the FAA Technical Center (ACT). Presents through organizational management, unresolved T&E issues, problems, or violations of T&E policy to the TPRC; provides T&E assessments to support the DRR process; and provides an APMT who acts as an agent for each project's T&E program, which includes establishing overall test schedules, coordinating tests, ensuring that all test requirements are satisfied and that tests are performed in accordance with approved procedures. The APMT jointly prepares the FAA MTP; directs and conducts OT&E Integration and Operational testing; and is responsible for FAA ACT facility T&E readiness.

h. Office of Independent Operational Test and Evaluation Oversight (ATO). Performs independent assessment of MA's and subsystems designated for IOT&E oversight; serves as a member of the TPRC; coapproves appropriate FAA MTP's and revisions to FAA MTP's; reviews T&E requirements, plans, procedures, and reports; monitors OT&E tests; and provides independent assessment reports of operational effectiveness and suitability directly to the Administrator and the Acquisition Review Committee (ARC).

i. Department of Defense (DOD) Representative. Reviews interagency agreements involving joint DOD programs; reviews and coordinates T&E test requirements, test plans, and reports; advises the PM of system or component design, or technology designated as critical to the United States; and provides advice on DOD security needs.

11. TEST POLICY REVIEW COMMITTEE ORGANIZATION. The TPRC will support the NAS T&E policy by providing management and accountability oversight to the FAA organizational participants in the implementation of this policy. The specific responsibilities and membership of the TPRC are:

a. Responsibilities of the Test Policy Review Committee. The chairperson will ensure the accomplishment of the TPRC responsibilities. The TPRC responsibilities consist of supporting the T&E policy, test standards, and definitions; approval of operating procedures, approval of FAA MTP's, and revisions to FAA MTP's; approval of test policy waivers; and resolution of disagreements on T&E issues when agreements cannot be reached at lower levels of FAA management.

b. Membership of the Test Policy Review Committee. The following is the TPRC membership list: Chairperson - Deputy Associate Administrator, System Engineering and Development; Secretariat - Manager, Configuration Management and Engineering Specialties Division; Director, NAS System Engineering Service; Director, NAS Transition and Implementation Service; Special Assistant to the Associate Administrator, NAS Development (AND-3); Program Director or equivalent for NAS project under consideration; Director, Systems Maintenance Service; Director, Air Traffic Plans and Requirements Service; Director, Logistics Service; Director, Flight Standards Service; Director, Engineering, Integration and Operational Evaluation Service; Department of Defense (for FAA/DOD joint projects only); Director, Facility System Engineering Service (for ANS-200 projects only); Director, Office of Independent Operational Test and Evaluation Oversight (for MA's and subsystems designated for IOT&E oversight only).

12. WAIVERS. Waiver requests shall be initiated via memorandum signed at the Program Director or Service Director level and submitted to the TPRC through the Secretariat in accordance with the TPRC operating procedures in part 5 of appendix 1. It will identify the part(s) of the policy for which the waiver is requested and include supporting rationale, including alternatives.


Thomas C. Richards
Administrator



T&E POLICY ORDER APPENDIX 1 DESCRIPTIONINTRODUCTION:

This appendix provides support to implementation of Order 1810.4B, FAA NAS Test and Evaluation Policy. Appendix 1 and its seven parts provide top-level implementation guidance and information to be used in the preparation of program T&E policy requirements.

CONTENTS:

a) The appendix 1 contains a Table of Contents that identifies seven parts that are subsets of the appendix 1.

b) Appendix 1, parts 1 and 2 provide an acronym list and a list of T&E terms and definitions.

c) Appendix 1, part 3 describes individual T&E responsibilities for each FAA organization. The first half of Appendix 1, part 3 contains lists of responsibilities arranged according to FAA organization. The second half of Appendix 1, part 3 contains matrix representations of responsibilities and test requirement sources for each T&E component.

d) Appendix 1, part 4 details the steps involved in implementing the T&E policy for each phase of testing.

e) Appendix 1, part 5 contains the TPRC operating procedures, which detail the review/distribution process for test documentation, including waivers and FAA MTP's.

f) Appendix 1, part 6 contains information on developing project specification and FAA MTP's VRTM's.

g) Appendix 1, part 7 is a compilation of selected T&E information. It includes a list of reference materials, test requirement examples, T&E component expansion graphic, and OT&E Shakedown documentation examples.



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PART 1. ACRONYMS LIST

AAF	Associate Administrator for Airway Facilities
AAP	Program Manager for Advanced Automation
AAT	Associate Administrator for Air Traffic
ACD	Engineering, Research, and Development Service
ACN	Engineering, Test and Evaluation Service
ACW	Engineering, Integration and Operational Evaluation Service
ACT	Director, Technical Center
AFE	Facility System Engineering Service
AFS	Flight Standards Service
AHT	Office of Training and Higher Education
ALG	Logistics Service
AMC	Aeronautical Center
ANA	Program Director for Automation
ANC	Program Director for Communications
AND	Associate Administrator for NAS Development
ANN	Program Director for Navigation and Landing
ANR	Program Director for Surveillance
ANS	NAS Transition and Implementation Service
ANW	Program Director for Weather and Flight Service Stations
APM	Program Management Service
APMT	Associate Program Manager for Test
ARD	Research and Development Service
ASD	Associate Administrator for System Engineering and Development
ASE	NAS System Engineering Service
ASM	Systems Maintenance Service
ASU	Office of Acquisition Support
ATH	Office of Air Traffic System Effectiveness
ATM	Office of Air Traffic System Management
ATP	Air Traffic Rules and Procedures Service
ATQ	Office of Independent Operational Test and Evaluation Oversight
ATR	Air Traffic Plans and Requirements Service
AVR	Associate Administrator for Regulation and Certification
AXQ	Executive Director for Acquisition and Safety Oversight
CAI	Contract Acceptance Inspection
CCB	Configuration Control Board
CDR	Critical Design Review
CIP	Capital Investment Plan
CM	Configuration Management
CO	Contracting Officer
COTS	Commercial/Off-the-Shelf
COTR	Contracting Officer's Technical Representative
CPFS	Computer Program Functional Specification
DID	Data Item Description
DOD	Department of Defense
DOT	Department of Transportation
DQT	Design Qualification Test
DRR	Deployment Readiness Review
DT&E	Development Test and Evaluation

FAA	Federal Aviation Administration
FAT	Factory Acceptance Test
FCC	Federal Communications Commission
FMDT	Fixed Maintenance Data Terminal
GFE	Government Furnished Equipment
HW	Hardware
ICD	Interface Control Document
IFB	Invitation for Bid
IOC	Initial Operational Capability
IOT&E	Independent Operational Test and Evaluation
IRD	Interface Requirements Document
JAI	Joint Acceptance Inspection
KDP	Key Decision Point
KDP 1	Key Decision Point 1
KDP 2	Key Decision Point 2
KDP 3	Key Decision Point 3
KDP 4	Key Decision Point 4
LSA	Logistics Support Analysis
MA	Major Acquisition
MDT	Maintenance Data Terminal
MNS	Mission Need Statement
MTP	Master Test Plan
NAS	National Airspace System
NDI	Non Developmental Item
OCD	Operational Capability Demonstration
OMB	Office of Management and Budget
ORD	Operational Readiness Date
OSHA	Occupational Safety and Health Administration
OT&E	Operational Test and Evaluation
PAT&E	Production Acceptance Test and Evaluation
PD	Program Directive
PDR	Preliminary Design Review
PM	Program Manager
PR	Procurement Request
QA	Quality Assurance
QRO	Quality Reliability Officer
RE&D	Research, Engineering and Development
RFP	Request For Proposal
RMS	Remote Monitoring Subsystem
RMMS	Remote Monitoring Maintenance System

SAT	Site Acceptance Test
SE CCB	System Engineering Configuration Control Board
SOP	Standard Operating Procedure
SOW	Statement of Work
SRB	Specification Review Board
SW	Software
T&E	Test and Evaluation
TDWR	Terminal Doppler Weather Radar
TOR	Technical Onsite Representative
TPRC	Test Policy Review Committee
VRTM	Verification Requirements Traceability Matrix



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PART 2. FEDERAL AVIATION ADMINISTRATION TEST AND EVALUATION POLICY TERMS AND DEFINITIONS

NOTE: These terms and definitions indicate the way they are used in this order or the T&E Program.

1. Acceptance Test - A functional check of each Statement of Work (SOW) Production Contract Item, conducted by the contractor. (See Factory Acceptance Test (FAT) and Site Acceptance Test (SAT).)
2. Acquisition - The process of establishing requirements; developing and testing appropriate designs for equipment, systems, and capabilities; and producing products when assured they meet requirements.
3. Acquisition Review Committee - Defined in Order 1810.1E, Major Acquisitions. Evaluates the readiness of MA's and designated programs to proceed to the next KDP.
4. Analysis - This is a method of verification which consists of comparing hardware or software design with known scientific and technical principles, technical data, or procedures and practices to validate that the proposed design will meet the specified functional or performance requirements.
5. Approval - Approval as used in this order is the designated FAA service organization(s) with the responsibility for final release or promulgation of T&E requirements, plans, procedures, or reports. (See Review.)
6. Associate Program Manager for Test (APMT) - The ACN, ACW, or ACD designated individual appointed for each project that has T&E responsibilities as defined in this order.
7. Availability - Availability is the probability that an item will be operationally ready to perform its function when called upon at any point in time.
8. Commercial/Off-The-Shelf (COTS) - COTS is defined to be a hardware or software product that is produced and placed in stock by a contractor or stocked by a distributor, before receiving orders or contracts for its sale. The product is sold or traded to the general public in the course of normal business operations at prices based on established catalog or market prices. From a T&E perspective, this means that the item has undergone prior qualification testing. Additionally, salient characteristics about the item are published, including test conformance information pertaining to Operational Safety and Health Administration (OSHA) regulations, Military Standards, or Federal Communications Commission (FCC) licensing.
9. Concept Phase - The initial T&E phase in a NAS program acquisition. A MNS defines user operational requirements and initiates this phase. Primary objectives during this phase are the evaluation of alternative implementation concepts and technical risk assessments.
10. Configuration Control Boards (CCB's) - CCB's are responsible for establishing baselines and controlling and managing all changes to those baselines for systems/subsystems stated in a CCB Charter. Project specifications are reviewed and approved by FAA's Configuration Management process.

11. Configuration Management (CM) - CM is the discipline used to identify, control, account for, and audit the functional and physical characteristics of end products.
12. Contract Acceptance Inspection (CAI) - The CAI is the formal acceptance by the FAA of a subsystem from the contractor. When the contractor has turn-key or NAS site installation and checkout responsibilities, the CAI is completed after site acceptance testing at the field site. (See Site Acceptance Testing (SAT).)
13. Contracting Officer (CO) - The CO is responsible for ensuring performance of all necessary actions for effective contracting, ensuring compliance with the terms of the contract, and safeguarding the interests of the United States in its contractual relationships. The CO is responsible for negotiation and award of the contract and for contract administration after award. The CO is the only Government representative who is authorized to issue changes to the requirements of the contract.
14. Contracting Officer's Technical Representative (COTR) - The COTR is appointed by the CO to assist in the technical aspects of administering the contract. (See Technical Onsite Representative (TOR).)
15. Contractor's Master Test Plan (MTP) - The contractor's MTP provides information that pertains strictly to testing to be accomplished by the contractor for DT&E, PAT&E and SAT. This MTP shows traceability to the project specification VRTM and identifies the allocation of test requirements to subsequent test plans and procedures. It is contractually developed from the DT&E/PAT&E test requirements stated in the Quality Assurance Section of the Project Specification and the SOW. It is a Contract Deliverable usually specified to be available at the PDR time-frame.
16. Critical Design Review (CDR) - A formal contractor presentation to the PM for approval and baselining of HW/SW equipment design.
17. Critical Test and Evaluation (T&E) Issues - These may be:
 - a. external program issues of technical and operational risk such as the parallel development and test availability of interoperable subsystems or FAA NAS operational software, interface development based on ICD's previously developed by a contractor and FAA accepted on the basis of simulation testing;
 - b. NAS transitioning design issues in either having to interface with interim NAS hardware/software or there is a requirement to operate in a NAS parallel operations (shadow) mode for safety reasons;
 - c. internal program issues of technical and operational risk such as the satisfactory design of hardware or software itself in meeting new NAS operational functional and performance requirements;
 - d. OT&E issues that find the design implementation, human factors, documentation, training, maintainability, or logistic support of the program unacceptable from a NAS perspective.
18. Delta DT&E Testing - DT&E testing beyond the contractor's facility conducted at the FAA ACT and/or field test site. This testing occurs on those test requirements that require the NAS operational environment (e.g., stress, loading, and weather conditions), or NAS Government Furnished Equipment (Interfacing Subsystems) to complete qualification testing.

19. Delta OT&E - OT&E Integration and Operational testing and/or OT&E Shakedown conducted beyond the FAA ACT at a field test site. The testing occurs on those test requirements that require the NAS operational environment (e.g., stress, loading, and weather conditions), NAS interoperable subsystems, or site location required to complete the verification of the requirement.

20. Demonstration - This is a method of verification where qualitative versus quantitative validation of a requirement is made during a dynamic test of the equipment. Additional definitions applied to this term are:

a. If a requirement is validated by test during first article qualification testing and the requirement has enough significance that it is "retested" during acceptance test, then this acceptance testing can be indicated in the VRTM as a Demonstration.

b. In general, software functional requirements are validated by demonstration since the functionality must be observed through some secondary media.

21. Demonstration Phase - This test phase follows the Concept test phase. The primary objective for this test phase is that functional and performance requirements are validated through iterative demonstrations on model/prototype hardware or software for conformance to the operational requirements. T&E is accomplished to demonstrate that each system iteration meets the stated criteria and all requirements are traceable to a specification.

22. Deployment Readiness Review (DRR) - A corporate FAA assessment of the extent that a project is ready to be integrated into the NAS including whether the FAA infrastructure is prepared to accept, operate, and support the deployed project throughout its life-cycle.

23. Deployment Readiness Review (DRR) #1, #2, and #3 - The DRR number designations #1, #2, and #3 represent points of interface between the DRR Program and the T&E Program that will help to ensure deployment of operationally effective and operationally suitable subsystems. The overview of the T&E process shows that DRR #1 and DRR #3 are discrete points, whereas DRR #2 is an ongoing process. T&E issues that cannot be resolved at lower levels of FAA management may be brought to the TPRC for adjudication. Reference Order 1800.63, NAS Deployment Readiness Review (DRR) Program, for additional details.

DRR #1 - DRR interface #1 is the PM's review of the solicitation package which includes FAA ACT's ACN/ACW/ACD assessment of the adequacy of the project's T&E program.

DRR #2 - DRR interface #2 is the ongoing T&E program assessments which include review of MTP's and monitoring the results of T&E programs. Ongoing T&E assessments are provided by ACN/ACW/ACD and ASM to the responsible DRR FAA organization.

DRR #3 - DRR interface #3 includes a T&E deployment assessment made by ACN/ACW/ACD to the project DRR deployment decision process based on test results and reviews of DT&E and OT&E. ASM and ATR provide an OT&E Shakedown assessment and a deployment decision recommendation to the DRR decision process.

24. Design Qualification Test (DQT) - DQT is the testing conducted by the contractor to verify that the implemented hardware and software design meets the functional and performance requirements of the project specification. This testing is driven by the project specification VRTM. When certain "delta" requirements cannot be tested at the factory these requirements may be tested by the contractor at the FAA ACT and/or test site. (See Delta T&E.)

25. Development Phase - This test phase follows the Demonstration test phase. The first objective during this test phase is to qualify the functional and performance specification requirements on prototype or limited production hardware or software. The second objective during this test phase is to ensure the NAS interoperability, effectiveness/suitability, and supportability/maintainability of the hardware or software.

26. Development Test and Evaluation (DT&E) - DT&E is that T&E of a subsystem conducted primarily to assist the engineering design and development process by determining incrementally the degree to which functional engineering specifications are attained. DT&E includes T&E of subsystem hardware and software in full-scale engineering models and prototypes. When a subsystem has NAS interface requirements the implemented design will be tested as part of DT&E. DT&E implies that during first article processing, qualification testing will be required. (See Qualification Test and Evaluation (QT&E), Design Qualification Test (DQT), and Delta DT&E Testing.)

27. End-State Subsystem - An End-State subsystem is a NAS subsystem defined in the NAS-SS-1000 Volume I, Appendix I and III, and Volumes II through V.

28. FAA Master Test Plan (MTP) - The FAA MTP is a document prepared by the PM and APMT early in the concept phase and updated in subsequent T&E phases. It outlines the T&E process that will be used to ensure the project meets the requirements of the project specification and the system and subsystem requirements allocated to the project in the NAS-SS-1000 Volumes I through V and the NAS-SR-1000. The FAA MTP provides the program strategy and guidance for the development of test requirements included in the project SOW. The FAA MTP also contains OT&E test requirements and OT&E schedule durations.

29. FAA Master Test Plan (MTP) Verification Requirements Traceability Matrix (VRTM) - The FAA MTP VRTM contains NAS-SS-1000 System Specification system and subsystem OT&E Integration test requirements. The matrix will include a column for OT&E Shakedown users to indicate whether the test requirements will be used to satisfy Shakedown objectives. Also a column will exist for the APMT to indicate whether a test requirement is to be deferred because of the unavailability of interoperable NAS subsystems.

30. Factory Acceptance Test (FAT) - The FAT procedure is validated after DT&E at the factory on the first article. If the contractor has site testing responsibilities the FAT represents a partial FAA acceptance of the first article. During PAT&E, FAT is conducted by the contractor at his factory for each delivered item to verify that it conforms to applicable specifications, is free from manufacturing defects, and is substantially identical to the qualified hardware.

31. Field Shakedown - Field Shakedown is conducted at each NAS facility deployment of the subsystem by regional Airway Facility and Air Traffic local personnel. It is conducted in an operational environment to support determination that the subsystem is ready for full operation as part of the NAS. Field Shakedown occurs after contractor conducted site acceptance testing and CAI (PAT&E). Field Shakedown tests the readiness of each subsystem before its operation as part of the NAS. It is conducted prior to IOC on subsystems where IOC is a requirement, and is part of the overall Operational Readiness Demonstration that leads to Operational Readiness Date (ORD). During IOC the system is being utilized operationally for short periods of time, building to 24 hours per day, 7 days per week. Field shakedown involves successive acceptance of the equipment by the region and site personnel from the PM. These activities are defined in Order 6030.45, Facility Reference Data File, and called Joint Acceptance Inspections (JAI). The Operational Readiness Demonstration culminates at an ORD.

32. Field Test Site - A NAS regional facility that has been selected because it has operational interfaces or environmental conditions that allow the completion of OT&E testing (beyond, or in lieu of the FAA ACT) on the first subsystem prior to the DRR deployment decision.

33. First Article - First Article refers to the first subsystem built by the developer of the subsystem. Several subsystem articles may be necessary to complete qualification testing and acceptance testing demonstrations to show compliance with the specification requirements and SOW.

34. Follow-on Site Testing - Follow-on Site Testing is NAS OT&E Testing that for some reason could not be completed at the first test site or at the FAA ACT. An example of when Follow-on Site Testing would be used is when all interfaces may not be available at the FAA ACT. In this case some NAS OT&E Testing would be accomplished at the FAA ACT; however, Follow-on (NAS OT&E) Site Testing would be accomplished at a subsequent site (or sites) where the remaining interfaces are available. Thus, Follow-on Site Testing encompasses any NAS OT&E Testing that could not be completed at the first T&E site (or FAA ACT), but was completed at a subsequent site.

35. Functional Test - Functional Test indicates a test that is less restrictive than a qualification test and is used during acceptance testing. Functional tests ensure that equipment works according to design and that the function (requirement) is working for the production article being tested.

36. Independent Operational Test and Evaluation (IOT&E) Oversight - For MA programs and subsystems designated for IOT&E oversight, ATQ will assess compliance with the "System Requirements Statement" and an "Operational Readiness Criteria" checklist developed for each program. Each program is examined carefully, and when the Office of IOT&E Oversight identifies a system operational problem it is immediately reported to the appropriate program office for resolution. Operational areas addressed in IOT&E reports may be categorized as software, hardware, procedures, system, or human/machine/resource relationship. The extent to which a system increases safety and effectiveness depends on how well all of these considerations are integrated. From the results of both the DT&E and OT&E, the operational readiness of the system will be independently assessed and reported to the Administrator.

37. Initial Operating Capability (IOC) - IOC is that point when equipment hardware and software has been successfully installed and tested and meets defined requirements levied on the contractor at CAI. IOC occurs on subsystems where a time period is required to fully verify operational procedures along with training and familiarization. Field Shakedown has occurred to the extent that is required to ensure the hardware and/or software meet IOC, and should be considered a partial JAI where the maintenance responsibility is accepted. For automation type projects IOC is the decision point when a system has undergone Field Shakedown to the extent that Air Traffic and System Maintenance operational utilization of the people, hardware, software, and procedures are all ready to begin or resume service in the NAS.
38. Inspection - Is a method of verification to determine compliance with specification requirements and consists primarily of visual observations, or mechanical measurements of the equipment, physical locations, or technical examination of engineering-support documentation.
39. Interface Testing - Interface Testing is testing performed by either the contractor and/or the FAA ACT personnel to verify requirements as identified in the project/subsystem specification and IRD. Success criteria for this testing is identified in an Interface Control Document (ICD) produced by the contractor. In the case of contractor interface testing, the FAA may be required to support this testing by operating the Government-owned interfacing subsystem.
40. Joint Acceptance Inspection (JAI) - JAI's are activities conducted to gain consensus of all responsible FAA organizations that subsystems for facility establishment, improvement, or relocation are completed and satisfy the requirements of Order 6030.45, Facility Reference Data File, and that the facility is capable of performing its required functions.
41. Key Decision Points - OMB Circular A-109 for Major System Acquisitions defines a series of decision points in the acquisition cycle of a project.
42. Key Decision Point 1 - Authorizes the program to proceed with the concept analysis phase.
43. Key Decision Point 2 - Authorizes the program to proceed with the demonstration phase.
44. Key Decision Point 3 - Authorizes the program to proceed with full-scale development and limited production.
45. Key Decision Point 4 - Commitment of a system to full-scale production leading to installation and operation of the system.
46. Key Test Site - Synonymous with "Field Test Site".
47. Major Acquisition (MA) - Is a project that exceeds funding limits specified in Order DOT 4200.14C, Major Acquisitions. It is a program of unusual criticality, visibility, or risk and has total funding of at least \$50 million.
48. Master Test Plan (MTP) - (See Contractor's MTP and FAA MTP.)

49. Mission Need Statement (MNS) - A statement based on operational requirements that is submitted to the Acquisition Review Committee for a KDP 1 decision to initiate a NAS acquisition. The Concept phase of T&E begins with the acceptance of the MNS. The MNS is usually updated at each KDP milestone or when beginning the next sequential T&E phase.
50. National Airspace System (NAS) - The facilities, equipment, regulations, procedures, and personnel which support the safe and efficient movement of all aircraft in U.S. airspace.
51. National Airspace System (NAS) System - A system consists of all appropriate inter-operable NAS subsystems located in ground facilities that provide a total NAS capability or service to FAA operations and maintenance support personnel.
52. Non-End State Subsystem - A Non-End State Subsystem is defined as either:
- a. An existing NAS subsystem that will eventually be replaced by an end-state subsystem.
 - b. An end-state subsystem that is implemented in phases relative to end-state operational and functional objectives.
53. Operational Capability Demonstration - Before a production contract award, or an NDI acquisition; representatives from FAA testing organizations may be tasked by the program manager to participate in the evaluation/demonstration of a vendor's COTS hardware/software, or an entire NDI subsystem in meeting stipulated NAS functional and performance requirements.
54. Operational Effectiveness - Operational effectiveness is the degree of successful accomplishment in meeting operational and technical requirements of a subsystem used by representative operational personnel. This is evaluated in the context of the organization, doctrine, tactics, and environment anticipated for the planned operational employment of the subsystem.
55. Operational Readiness Date (ORD) - The ORD is the date on which a new or improved facility or subsystem satisfies the requirements of Order 6030.45, Facility Reference Data File. It is also the date that the Operational Readiness Demonstration is completed.
56. Operational Readiness Demonstration - Is an activity conducted by the FAA at a field test site that demonstrates the ability of local site personnel to operate and maintain fully a new subsystem.
57. Operational Suitability - Operational suitability is the capability of a subsystem to be satisfactorily integrated and employed for field use. Considerations are given to subsystem operation by field personnel for compatibility, reliability, human performance factors, maintenance and logistics support, safety, and training requirements.

58. Operational Test and Evaluation (OT&E) - OT&E is FAA T&E conducted to evaluate the subsystem operational effectiveness and suitability including compatibility, interoperability, degraded operations, survivability, maintainability, and supportability. OT&E also identifies deficiencies in NAS hardware, software, human performance factors, or operational concepts. It encompasses an interactive process of risk reduction demonstrations and analysis and ensures that NAS functionality (as it existed prior to installation of a new subsystem) is not degraded. OT&E as used in this order is the combination of Integration, Operational testing, and Shakedown verification and validation conducted by the FAA.

59. Operational Test and Evaluation (OT&E) Integration - OT&E Integration consists of testing NAS System End-to-end Performance. Specifically testing NAS-SS-1000 Volume I (System Level) and Volumes II through V subsystem level requirements as identified in the project's FAA MTP VRTM. This testing establishes NAS baseline performance (end-to-end), or verifies that previously existing NAS performance has not been degraded. To the greatest extent possible the subsystem will test in a NAS system equivalent environment. (See Delta T&E Testing.)

60. Operational Test and Evaluation (OT&E) Operational Testing - This testing has the intent of verifying the operational effectiveness and suitability of the equipment with user participation in the evaluation testing. Aspects of this testing are further defined as follows:

- a. Reliability, maintainability, and availability.
- b. Degraded operations and operational utilization scenarios.
- c. Stress and NAS loading testing of all inter-operable subsystems.
- d. Human factors.
- e. Safety and security.
- f. Site-adaptation.
- g. Transition switchover.

61. Operational Test and Evaluation (OT&E) Shakedown - OT&E Shakedown is independent verification and validation conducted by the user organizations to verify operational effectiveness and suitability, including supportability and maintainability of a subsystem in the NAS. This testing is directed by the ASM-400 or ASM-600 organizations. The test requirements and schedule durations are developed in coordination with the Air Traffic Requirements Service (ATR), and the Flight Standards Service (AFS), and then provided to the APMT for inclusion in the FAA MTP. Subsequent test plans, procedures, and test conduct are directed by ASM-400 or ASM-600 in coordination with ATR.

62. Preliminary Design Review - A formal meeting conducted by the contractor who presents for approval by the PM the HW/SW design and the contractor's MTP DT&E/PAT&E overview.

63. Production Acceptance Test and Evaluation (PAT&E) - PAT&E is contractor-conducted testing, performed on each delivered item to verify that end-items conform to applicable specifications, is free from manufacturing defects, and is substantially identical to the qualified hardware. (See FAT and SAT.)

64. Production Phase - The final T&E phase follows the successful completion of the Development phase and DRR deployment decision. The T&E components for this phase are PAT&E and Field Shakedown. This phase culminates in last ORD.

65. Program - A program is one or more projects which have functional and managerial commonalities, e.g., Maintenance Automation is a program comprised of several projects that include Maintenance Processor Subsystem and Remote Maintenance Subsystem.

66. Program Directive (PD) - A PD is an agreement negotiated between a PM and Associate Program Managers. The PD defines the work of tasks to be performed, the products or services to be delivered, the schedule, the management progress reports to be provided, and the fiscal resources to be supplied by the PM.

67. Program Manager (PM) - The PM is the individual responsible for the design, development, testing, evaluation, production, and introduction into the NAS of the end product of an acquisition.

68. Project - Project is synonymous with "subsystem." Reference definition of "program."

69. Project Specification Verification Requirements Traceability Matrix (VRTM) - The project specification VRTM is a matrix that presents in an easy-to-read form the requirements in the project specification that are developed or derived from, and traceable to, the NAS level system specification. The project specification requirements are identified by paragraph and name and listed in a matrix. The method of verification is also included in a project specification VRTM. This VRTM and other specific testing identified in the Quality Assurance section of the specification become drivers for the contractor's DT&E and PAT&E test components.

70. Qualification Test and Evaluation (QT&E) - This is a DOD term used in certain joint FAA project specifications. It is the same as FAA's terminology of DT&E on the first article of a Production phase contract when the Development phase has been waived. The Development phase is generally waived when the subsystem uses state-of-the-art design and manufacturing technology. (See Design Qualification Test and DT&E.)

71. Requirements Related Definitions - Multiple uses in its definitions throughout policy.

a. Program Requirements - Those specified capabilities that must be provided by the program office. These may be responsibilities resulting from the various processes (MA, T&E, and DRR) that interact with the organizations responsible for implementing user objectives as stated in the MNS.

b. T&E Requirements - Those requirements that may be applied to a program as described in this order's policy and implementation.

c. Functional Requirement - The type of requirement that describes what the system must do to satisfy the operational requirements. A functional requirement must have an action verb and should have well defined inputs and outputs. A functional requirement is 'static' in the sense that the sequence of activity is not specified (e.g., post flight plan for controlled aircraft crossing an airspace sector boundary).

d. Performance Requirement - The type of requirement that describes how well a function must be performed. A performance requirement may be either qualitative or quantitative. In the system engineering process, performance requirements are derived from operational requirements and budgeted against the functional requirements as part of the specification process (e.g., post flight plan 15 minutes before airspace sector boundary crossing).

e. Operational Requirement - The type of requirement that qualifies and quantifies the services and products which must be provided to NAS users and NAS specialists. Operational requirements should be directly related to the NAS mission and may be influenced by a predetermined Operations Concept.

f. Verification Requirements - Those functional and performance requirements that implement engineering system/subsystem design, and that must be validated by either Test, Demonstration, Inspection, or Analysis.

g. Test Requirement - Those verification requirements that will exclusively drive subsequent test plans and procedures, conducted by the contractor or FAA. These may include those requirements to be verified by demonstration.

h. User Requirements -

(1). User mission need objectives encompassed by the implementing engineering design and that are qualified and acceptance tested from a contractor.

(2). User generated OT&E Operational testing and OT&E Shakedown requirements generated by the use of AT and AF experienced personnel utilizing the hardware and software in NAS operational scenarios, including NAS system interoperability of equipment with its operational concept of utilization, degraded operations, and backup modes.

72. Review - Review as used in this order is the designated FAA Service organization(s) with the responsibility of providing an evaluation of T&E requirements, plans, procedures, or reports via clearance record comments to the organization responsible for the generation of the element.

73. Site Acceptance Testing (SAT) - SAT is contractor-conducted testing performed at each field site before acceptance of the subsystem by the FAA CAI. SAT procedures are validated during DT&E and constitute part of PAT&E when being conducted at field deployment sites.

74. Specification Review Board (SRB) - The SRB performs a review of project specifications prior to CCB final specification review and approval. The significance of the SRB in relation to T&E is the fact that T&E personnel work with the PM to provide T&E input to project specifications and subsequent updates based upon SRB comments.

75. Subsystem - Subsystem is a component of the NAS.

76. System Performance Testing - System performance testing is T&E to determine (through exercising of hardware and software) the degree to which a system meets functional performance requirements. These are quantitative evaluations that measure subsystem contributions to total functional performance. At the system and subsystem level, the T&E includes both normal and peak-load conditions to determine performance distributions (e.g., response time) and to determine the impact of increasing system load on system characteristics. System performance testing is accomplished during OT&E testing.

77. Technical Onsite Representative (TOR) - The TOR is appointed by the COTR and represents the COTR at the facility during the NAS subsystem's installation.

78. Test -

a. Is a method of verification that will measure equipment's performance under specific configuration-load conditions and after the controlled application of known stimuli. Quantitative values are measured, compared against previous predicted success criteria and then evaluated to determine the degree of compliance.

b. Used in its broadest sense, it describes a process for verification. For example, Design Qualification Test, which may include requirements that are verified by other methods of verification such as Analysis, Inspection, and Demonstration.

79. Test and Evaluation (T&E) - T&E is the process that verifies how well an acquisition product meets technical and operational requirements; provides data to assess acquisition, developmental, technical, and operational risk for decision making; verifies subsystem performance and ensures that all critical issues to be evaluated by testing have been adequately considered and resolved.

80. Test Policy Review Committee (TPRC) - Is an FAA group comprised of senior managers from the different FAA organizations who have varying elements of responsibility with regard to the promulgation of the FAA NAS T&E policy. It endorses the policy by providing management oversight into the accountability compliance of participants involved with the T&E of a program.

81. Test Reports - Test Reports are the formal and final reports delivered by the agency responsible for testing (i.e., the contractor, the FAA ACT, or ASM-400/ASM-600) from 30 to 90 days after testing is completed.

82. Test Report Summaries - Sometimes called a "Quick Look Report" and is a report which usually does not contain final results since it is delivered before analysis by the agency responsible for testing (i.e., the contractor, ACN, ACW, or ACD) to the PM. It is usually provided within 10 to 15 days from the completion of the test. ASM being responsible for OT&E Shakedown, and this sequentially following OT&E Integration and Operational testing, may require a report by 5 days because of the DRR schedule.

83. Verification - Verification is the process of systematically proving, by a combination of test, assessment, and evaluations, that a system and all of its subsystem elements comply with the functional and performance requirements desired in the NAS.

84. Verification Requirements Traceability Matrix (VRTM) - See FAA MTP VRTM and Project Specification VRTM.



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PART 3. TEST AND EVALUATION RESPONSIBILITIES AND CONSOLIDATED TEST AND EVALUATION RESPONSIBILITY MATRICES.

1. RESPONSIBILITIES. The following lists provide each organization's T&E obligations, responsibilities, and authorities, consistent with the contents of matrices in Appendix Part 3, paragraph 2. Those matrices provide an overall perspective on organizational interfaces and interactions for conducting T&E.

a. Test Policy Review Committee (TPRC). The chairperson will ensure the accomplishment of the TPRC responsibilities.

(1) Supports T&E policy, test standards, and definitions.

(2) Approves TPRC operating procedures.

(3) Approves FAA MTP's and revisions to FAA MTP's.

(4) Approves test policy waivers.

(5) Resolves disagreements on T&E issues when agreements cannot be reached at lower levels of FAA management.

b. Associate Administrator for System Engineering and Development (ASD).

(1) Provides PM's (via ARD) for NAS acquisition programs.

(2) Appoints chairperson (ASD-2) of the TPRC.

(3) Chairperson assumes responsibility of making final decisions on actions brought before the TPRC.

c. NAS System Engineering Service (ASE).

(1) Reviews FAA MTP's.

(2) Provides the NAS-SS-1000 System Specification requirements for inclusion in the FAA MTP VRTM or coordinates with System Engineering Service for requirements for those projects not included in the NAS-SS-1000.

d. Configuration Management and Engineering Specialties Division (ASE-600).

(1) Serves as the secretariat for the TPRC.

(2) Formulates revisions to test policy, test standards, and definitions for consideration and endorsement by the TPRC.

(3) Verifies compliance with this order and standards related to this order, utilizing TPRC approved processes.

(4) Develops and maintains the TPRC operating procedures.

(5) Provides and maintains implementation traceability for NAS verification via the VRTM's contained in the NAS-SS-1000 System Specification.

(6) Develops VRTM's for new NAS-SS-1000 System Specification projects and NAS IRD's.

e. National Airspace System (NAS) Transition and Implementation Service (ANS)

(1) Member of TPRC.

(2) Provides supportability requirements to the APMT for inclusion in the FAA MTP, which serves as guidance to ASM for the OT&E plans.

(3) Reviews FAA MTP's.

(4) Reviews requirements, plans, and procedures for OT&E Shakedown.

(5) Provides personnel for conducting and/or monitoring the conduct of OT&E Shakedown.

(6) Reviews OT&E Shakedown reports.

(7) Reviews PD's.

(8) Approves PD's.

f. NAS Development Special Assistant (AND-3)

(1) Member of TPRC.

(2) Reviews FAA MTP.

(3) Supports development of revisions to test policy, test standards, and definitions.

g. Facility System Engineering Service (AFE)

(1) Member of TPRC (for ANS-200 projects only).

(2) Identifies NAS system level requirements for inclusion in test plans and verifies that they are satisfied during the project's T&E test program.

(3) Provides the NAS-SS-1000 (Volume VI) System Specification requirements for inclusion in the FAA MTP VRTM.

(4) Reviews the FAA MTP (for ANS-200 projects only).

(5) Reviews OT&E Integration and Operational test requirements, plans, procedures, and reports (for ANS-200 projects only).

h. Department of Defense (DOD) Representative

- (1) Member of TPRC (for FAA/DOD joint procurements only).
- (2) Reviews and coordinates T&E test requirements, test plans, and reports for joint procurements.
- (3) Reviews DOD PD's concerning funding and/or participation of DOD organizations in FAA T&E activities.
- (4) Advises the PM if system or component design or the technology used in the design is designated as critical to the United States and requires accountability and/or distribution control.
- (5) Advises the PM of operational security concerns of significance to DOD which should be considered in contracts and other program documents under provisions of National Security Directive 298, and applicable DOD OPSEC directives.

i. NAS Research and Development Service (ARD), Program Directors for: Automation (ANA), Communications (ANC), Navigation and Landing (ANN), Surveillance (ANR), Weather and Flight Service (ANW), and Program Managers for: Microwave Landing System (AND-30), Advanced Automation (AAP), Facility Integration Division (ANS-200).

- (1) Member of TPRC (when agenda item is under their purview).
- (2) Provides PM for each project.
- (3) Endorses policy waiver requests initiated by the PM.
- (4) Reviews FAA MTP's.

j. Program Manager (PM)

- (1) Responsible for overall management of program.
- (2) Presents T&E deployment issues to the DRR.
- (3) Arranges with APMT for T&E support, coordination, and monitoring through an annual PD.
- (4) Approves PD's.
- (5) Tasks the APMT to prepare PD's between the program office and other FAA organizations.
- (6) Requests funding for project T&E, which is included in the overall program funding.
- (7) Responsible for receiving TPRC approval for the FAA MTP.

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(8) Prepares test policy waiver requests and submits to secretariat via the service director or program director as appropriate.

(9) Coordinates T&E requirements for DOD or other government agencies on joint procurements as the project requires.

(10) Develops, or has the APMT develop, the project specification VRTM and incorporates these requirements into the project specification prior to the Specification Review Board (SRB) approval.

(11) With APMT support, brings unresolved T&E issues before the TPRC via the TPRC secretariat.

(12) Arranges DT&E/PAT&E test support, directs or has the APMT direct DT&E when no contractor is involved, and provides or has the APMT provide technical direction for DT&E when a contractor is involved.

(13) Prepares or has the APMT prepare DT&E and PAT&E test requirements.

(14) Approves APMT-developed DT&E test plans, procedures, and reports.

(15) Recommends to the contract officer (CO) approval of contractor developed DT&E test plans, procedures, and reports.

(16) Reviews DT&E test plans, procedures, and reports.

(17) Monitors DT&E contractor conducted tests.

(18) Reviews OT&E Integration and Operational test requirements, plans, procedures, and reports.

(19) Approves OT&E Integration and Operational test requirements, plans, procedures, and reports.

(20) Monitors OT&E Integration and Operational tests.

(21) Monitors OT&E Shakedown.

(22) Reviews Field Shakedown requirements with the Airway Facilities Division organization.

(23) Reviews PAT&E test plans, procedures, and reports.

(24) Monitors Field Shakedown.

(25) Responsible for DT&E/PAT&E test plans, procedures, and reports distribution.

(26) Responsible for FAA MTP distribution.

(27) Responsible for identifying and prescribing appropriate distribution and accountability controls for program technology critical to the United States in accordance with applicable provisions of National Security Directive 298, and the Industrial Security Manual.

k. Director, FAA Technical Center (ACT) and Engineering, Test, and Evaluation Service (ACN)/Engineering, Integration and Operational Evaluation Service (ACW)/Engineering, Research and Development Service (ACD)

- (1) Member of TPRC (when agenda item is under their purview).
- (2) Provides APMT for each project (as agreed to with ACN/ACW/ACD).
- (3) Reviews FAA MTP.
- (4) Approves DT&E test procedures for APMT-developed DT&E at the divisional level.
- (5) Reviews test plans and reports for APMT-developed DT&E.
- (6) Provides for FAA ACT facility readiness as provided by the appropriate organization.
- (7) Reviews OT&E Integration and Operational test requirements.
- (8) Provides concurrence on OT&E Integration and Operational test plans and reports prior to review.
- (9) Provides concurrence on OT&E Integration and Operational test procedures at the division level prior to review.
- (10) Presents unresolved T&E issues, significant T&E test result problems, or violations of T&E policy to the TPRC.
- (11) Provides T&E assessments to the DRR.

1. Associate Program Manager for Test (APMT)

- (1) Supports development of test policy and test standards.
- (2) Acts as the agent of the PM to manage the T&E program; including establishing overall test schedules, coordinating tests, ensuring that all test requirements are satisfied, and that tests are performed in accordance with approved procedures.
- (3) Prepares, coordinates, and approves with the PM an annual Program Directive (PD) which addresses all T&E task support activities for the project.
- (4) Prepares appropriate T&E inputs to project documents, e.g., project procurement package, and as specifically tasked in the PD.
- (5) Prepares PD's between the project office and other FAA or DOD organizations to fund and/or arrange for the organizations' participation in T&E activities.
- (6) Coordinates DOD PD's with DOD TPRC representative.

- (7) Jointly prepares and updates the FAA MTP with the PM.
 - (8) Provides updates of available test results during DRR telecons and assists in providing the T&E assessment to ACN/ACW/ACD for the DRR.
 - (9) Reviews DT&E test requirements, plans, procedures, and reports.
 - (10) Coordinates with performing organizations and monitors DT&E, PAT&E, and OT&E activities.
 - (11) Reviews contractor-prepared DT&E plans, procedures, and reports.
 - (12) Prepares DT&E test plans, procedures, and reports when tasked by the PM to develop hardware or software instead of a contractor.
 - (13) Conducts DT&E testing if tasked by the PM and monitors DT&E testing performed by a contractor.
 - (14) Reviews PAT&E (factory and/or site acceptance) test requirements, plans, procedures, and reports.
 - (15) Prepares OT&E Integration and Operational test requirements for inclusion in the FAA MTP.
 - (16) Prepares OT&E Integration and Operational test plans, procedures, and reports.
 - (17) Reviews OT&E Shakedown requirements, plans, and procedures.
 - (18) Directs and conducts OT&E Integration and Operational tests. ASM-400/600 may optionally participate in test conduct.
 - (19) Reviews all OT&E Shakedown reports [information only].
 - (20) Reviews Field Shakedown requirements, plans, procedures, and reports.
 - (21) Monitors OT&E Shakedown.
 - (22) Monitors Field Shakedown.
- m. Systems Maintenance Service (ASM)
- (1) Member of TPRC.
 - (2) Identifies and develops with the PM and APMT, OT&E Shakedown requirements for inclusion in the FAA MTP.
 - (3) Optionally supplies draft PD, reviews and approves final PD.
 - (4) Reviews FAA MTP.

(5) Reviews OT&E Integration and Operational test requirements, plans, and reports.

(6) Monitors DT&E tests.

(7) Monitors OT&E Integration and Operational tests and optionally participates in OT&E Integration and Operational test conduct.

(8) Prepares OT&E Shakedown requirements, plans, procedures, and reports in coordination with ATR.

(9) Approves in coordination with ATR additional OT&E Shakedown requirements that do not exceed OT&E Shakedown durations or costs as baselined in the FAA MTP.

(10) Approves OT&E Shakedown plans, procedures, and reports.

(11) Directs and conducts OT&E Shakedown as applicable to OT&E requirements. ATR will support and participate in those tests that are applicable to ATR OT&E Shakedown requirements.

(12) Provides personnel for performing and/or monitoring the conduct of OT&E Shakedown.

(13) Conducts OT&E Shakedown data analysis.

(14) Provides a deployment recommendation based on OT&E Shakedown results in support of the DRR.

(15) Monitors and optionally participates in test conduct of Field Shakedown.

n. Air Traffic Plans and Requirements Service (ATR)/
Flight Standards Service (AFS)

(1) Member of TPRC.

(2) Reviews and approves PD's.

(3) Provides requirements for and reviews the FAA MTP.

(4) Provides operational expertise and planning for conducting and analyzing tests.

(5) Reviews DT&E requirements.

(6) Provides personnel to support monitoring and conduct of DT&E.

(7) Reviews PAT&E test requirements.

(8) Provides personnel to support monitoring and conduct of PAT&E.

(9) Provides test requirements (via the FAA MTP), supports test plan development, and reviews test plans and procedures for OT&E Integration and Operational tests.

(10) Provides and approves additional test requirements (that do not exceed OT&E Shakedown durations or costs as baselined in the FAA MTP), not identified in the TPRC-baselined FAA MTP for OT&E Integration and Operational tests. When changes or additions are required which exceed cost or schedule previously planned, the normal process for adjusting the testing planned and resolving disagreements applies, i.e., recourse to negotiations, TPRC.

(11) Determines the operational acceptability of new ATC operational computer programs or systems prior to their delivery for operational testing and use in field facilities.

(12) Provides personnel for conducting and/or monitoring the conduct of OT&E Integration and Operational tests.

(13) Reviews OT&E Integration and Operational test reports.

(14) Provides and coordinates test requirements, supports test plan development, and reviews test plans and procedures for OT&E Shakedown.

(15) Provides personnel for conducting and/or monitoring the conduct of OT&E Shakedown.

(16) Reviews OT&E Shakedown reports.

(17) Provides and reviews requirements, plans, and procedures for Field Shakedown.

(18) Monitors the conduct of Field Shakedown.

(19) Reviews Field Shakedown reports.

(20) Provides a deployment recommendation based on OT&E Shakedown results in support of the DRR.

o. Office of Air Traffic System Management (ATM)

(1) Reviews Field Shakedown requirements, plans, procedures, and reports.

(2) Determines the operational acceptability of new ATC operational computer programs or systems prior to their delivery for operational testing and use in field facilities.

(3) Monitors Field Shakedown.

(4) Monitors computer program implementation schedules to ensure operational requirements are met.

(5) Manages requirements for new airspace management systems.

(6) Reviews PD's via ATR.

p. Air Traffic Rules and Procedures Service (ATP)

- (1) Reviews Field Shakedown requirements, plans, procedures, and reports.
- (2) Monitors Field Shakedown.
- (3) Reviews PD's via ATR.

q. Associate Administrator for Contracting and Quality Assurance (ASU)

- (1) Member of TPRC.
- (2) Reviews PD's and approves PD's.
- (3) Reviews FAA MTP and contractor's MTP.
- (4) Reviews DT&E test plans, procedures, and reports.
- (5) Reviews PAT&E test plans, procedures, and reports.
- (6) Verifies completeness of program by reviewing the final OT&E Integration and Operational testing, Shakedown, and Field Shakedown reports from each site.

r. FAA Contracting Officer (CO)

- (1) Approves DT&E test plans, procedures, and reports for contractual compliance.
- (2) Ensures DT&E tests are conducted per contract (when a contractor is involved).
- (3) Approves PAT&E test plans, procedures, and reports for contractual compliance.

s. Contracting Officer's Technical Representative (COTR)

- (1) Reviews DT&E test plans, procedures, and reports.
- (2) Reviews PAT&E test plans, procedures, and reports.

t. Quality Reliability Officer (QRO)

- (1) Monitors DT&E tests.
- (2) Monitors PAT&E tests. Accepts/rejects product as designated by the CO.
- (3) Reviews DT&E test plans, procedures, and reports.

(4) Reviews PAT&E test plans, procedures, and reports.

(5) Ensures PAT&E tests are conducted per contract.

u. Office of Independent Operational Test and Evaluation Oversight (ATQ).
Performs the following tasks for MA's and subsystems designated for IOT&E oversight:

(1) Member of TPRC.

(2) Reviews FAA MTP.

(3) Coapproves FAA MTP's and revisions to FAA MTP's.

(4) Reviews DT&E test requirements, plans, procedures, and reports.

(5) Reviews OT&E Integration and Operational test requirements, plans, procedures, and reports.

(6) Reviews OT&E Shakedown requirements, plans, procedures, and reports.

(7) Reviews PAT&E test requirements, plans, procedures, and reports.

(8) Reviews Field Shakedown requirements, plans, procedures, and reports.

(9) Monitors DT&E, PAT&E, OT&E Integration and Operational tests, OT&E Shakedown, and Field Shakedown.

(10) Prepares independent assessment reports of operational effectiveness and suitability for the Administrator and the Acquisition Review Committee.

v. Regional Airway Facilities Division

(1) Supports PM's in the development of test requirements for inclusion in FAA MTP's.

(2) Supports PM's in the implementation of FAA MTP's at test and operational facilities.

(3) Responsible for overall Field Shakedown in cooperation with Air Traffic Division. Reference Order 6030.45, Facility Reference Data File, for more specific delineation of roles and responsibilities between the PM and Airway Facility Sectors and local site personnel.

(4) Coapproves jointly with Air Traffic Division Field Shakedown requirements with the PM.

(5) Approves Field Shakedown plans, procedures, and reports.

(6) Participates in the conduct of OT&E Integration and Operational testing and OT&E Shakedown as coordinated with the ASM organization.

(7) Directs Field Shakedown that is in satisfaction of Airway Facility Division test requirements or objectives and as coordinated with Air Traffic Division.

(8) Conducts Field Shakedown in coordination with Air Traffic Division. ASM-400/600 may optionally participate in test conduct.

(9) Reviews PD's established in support of the PM and APMT.

w. Airway Facilities Sectors

(1) Participate in FAA MTP activities as required by Airway Facilities Division.

(2) Develop Field Shakedown requirements, plans, and procedures in coordination with the facility Air Traffic organization.

(3) Conduct Field Shakedown, including Joint Acceptance Inspection (JAI) and reports results in coordination with facility Air Traffic organization.

x. Regional Air Traffic Division

(1) Supports PM's via ATR in the development of test requirements for inclusion in their FAA MTP's.

(2) Supports PM's in the implementation of FAA MTP's at test and operational facilities, as required by ATR.

(3) Supports Airway Facilities Division in the development of Field Shakedown requirements, plans, procedures, and reports with the inclusion of Regional Air Traffic Division objectives and interests.

(4) Provides coordination to Airway Facilities Division for Field Shakedown requirements, plans, procedures, and reports.

(5) Participates in the conduct of OT&E Integration and Operational testing and OT&E Shakedown as coordinated with the ATR organization.

(6) Supports Field Shakedown that is in satisfaction of regional Air Traffic Division test requirements or objectives, and as coordinated with Airway Facilities Division.

(7) Conducts Field Shakedown in coordination with Airway Facilities Division.

(8) Monitors Field Shakedown.

(9) Reviews PD's via ATR.

y. Air Traffic Facilities

(1) Participates in FAA MTP activities as required by ATR through regional Air Traffic Division.

(2) Supports development of Field Shakedown requirements, plans, procedures, and reports in coordination with facility Airway Facilities organizations.

(3) Conducts and monitors Field Shakedown and reports results in coordination with facility Airway Facilities organizations and regional Air Traffic Division.

(4) Reviews PD's via ATR and regional Air Traffic Division.

z. System Engineering Configuration Control Board (SE CCB)

(1) Approves test standards and definitions.

(2) Approves NAS-SS-1000 NCP's and IRD's that affect system requirements.

aa. NAS Configuration Control Board, (AND/ASD/AAF CCB)

(1) Approves DT&E requirements contained in the project specification (e.g., project specification VRTM).

(2) Approves PAT&E requirements contained in the project specification.

2. CONSOLIDATED TEST AND EVALUATION RESPONSIBILITY MATRICES. The following matrices indicate, in a consolidated form, many of the responsibilities listed in Appendix Part 3, paragraph 1, along with suggested sources for test requirements.

a. MATRICES FOR FAA MASTER TEST PLANS (MTP's). The matrices shown in Figures A3-1 and A3-2 apply to FAA MTP's.

(1) FAA MASTER TEST PLAN RESPONSIBILITY MATRIX. The matrix responsibilities shown in Figure A3-1 indicate appropriate FAA organizations that must take some action relative to the development of an FAA MTP. Each organization separated by a comma must perform the same action. Organizations separated by a slash and the corresponding FAA ACT, ACN, ACW, or ACD test support organization will perform the action only when the NAS subsystem is being supported by that organization.

Figure A3-1. FAA Master Test Plan (MTP) Matrix

ACTION	REQUIREMENTS #	PLAN
PREPARE	PM, APMT, ASM-400/600, ATR, ASE-600, AFE, ANS, AFS ***	PM, APMT
REVIEW		ARD/ANA/ANN/ANR/ANC/ ANW/AND-30/AAP/ ANS-200 ## , ASM, ASU, ASE-1, ANS, AAF-11 ACN/ACD/ACW, ATR, AFS, ATQ-1 ** , AND-6 * , AND-3, AFE **** , [Airway Facilities Division, regional Air Traffic Division] *****
APPROVE		TPRC, ATQ-1 **
DISTRI- BUTION		Airway Facilities Division, regional Air Traffic Division, AAC-400, ACT, AAC-900, ATH, ASE-600, [Airway Facilities Sectors and Air Traffic Facilities] *****, plus above

Explanation of "REQUIREMENTS" - ASE-600 is responsible for generating FAA-STD-024 which describes content and format requirements for an FAA MTP.

Review limited to projects within purview of service organization.

* AND-6 Point of Contact for DOD representative on joint procurements only.

** MA's and subsystems designated for IOT&E oversight only.

*** Identification of organizations responsible for the generation of OT&E requirements to be included in the FAA MTP. ASM, ATR, and APMT coordinate with selected Airway Facilities Division and regional Air Traffic Division regions in support of determining OT&E requirements.

**** For ANS-200 projects only.

***** Review of FAA MTP required by all potential "Field Test Site" locations, regional Airway Facilities Division, and regional Air Traffic Division personnel.

(2) FAA MASTER TEST PLAN TEST REQUIREMENTS SOURCES MATRIX. The matrix provided in Figure A3-2 shows the primary sources to be reviewed when compiling test requirements in the form of a Test VRTM for the FAA MTP during the Development phase. Sources are priority listed for test requirements content. The matrix also includes examples of other supporting documents that shall be considered for review even though they are not primary sources for test requirements.

Figure A3-2. FAA Master Test Plan Test Requirements
Sources for Development Phase Matrix

Source of Test Requirements	Organization Responsible for Maintaining Source Document
NAS-SS-1000, NAS-DD-1000, System Engineering Doc.	ASE-1, ARD-1
User-Sources of Degraded Scenarios	ASM, ATR, ACN/ACW/ACD, regional AF and AT
Existing Site Documentation - Baseline Performance	ASM, ATR, ACN/ACW/ACD, regional AF and AT
NAS-MD: Computer Program Functional Specifications	ATR
NAS-SR-1000, Operational Concept Documents	AAF/ATR/ASM
Other Supporting Documents - Examples: FAA orders Plans (test, program) Program directives Field Standard Operating Procedures (SOP's) Reference: Appendix Part 7 paragraph 1 and Figure 7-1, OT&E Checklist Components	Various organizations Various organizations Various organizations Various organizations

b. MATRICES FOR DEVELOPMENT TEST AND EVALUATION (DT&E). The matrices shown in Figures A3-3 and A3-4 apply to DT&E testing.

(1) DEVELOPMENT TEST AND EVALUATION RESPONSIBILITY MATRIX. The matrix responsibilities shown in Figure A3-3 indicate appropriate FAA organizations that must take some action relative to DT&E. Each organization separated by a comma must perform the same action. Organizations separated by a slash and the corresponding FAA ACT, ACN, ACW, or ACD test support organization will perform the action only when the NAS subsystem is being supported by that organization.

Figure A3-3. Development Test and Evaluation (DT&E) Matrix #

ACTION	REQUIREMENTS #	PLANS	PROCEDURES	TEST	REPORTS
PREPARE	PM	Contr (APMT *)	Contr (APMT *)		Contr (APMT *)
REVIEW	ATR, AFS ATQ-1 * APMT	PM, APMT, QRO, COTR, ATQ-1 ** , ASU, ACN/ACD/ACW *	PM, APMT, QRO, COTR, ATQ-1 ** ASU, ACN/ACD/ACW (Div.Level) *		PM, QRO, APMT, COTR, ATQ-1 ** ASU, ACN/ACD/ACW *
APPROVE	AND/ASD/ AAF CCB	CO, PM, ACN/ACD/ACW *	CO, PM, ACN/ACD/ACW (Div.Level) *		CO, PM, ACN/ACD/ACW *
DISTRIBUTION	ASM, AHT, plus above	ASM, ATR, AHT, AFS, plus above	ASM, ATR, AHT, AFS, plus above		ASM, ATR, AFS, AHT, plus above
DIRECT				CO (PM *)	
CONDUCT				Contr (APMT *)	
MONITOR				APMT, ASU, PM, ATR, AFS, ASM, ATQ-1 **, QRO	

* If the APMT (instead of a contractor) is tasked by the PM to conduct DT&E, the PM will direct the DT&E effort and the DT&E plans, and reports will be prepared by the APMT and approved by ACN/ACW/ACD and the PM. Procedures will be approved at the division level of ACN/ACW/ACD and the PM.

** MA's and subsystems designated for IOT&E oversight only.

Explanation of Matrix. The requirements for DT&E are generated by the PM in a project specification or purchase description which contains a project specification VRTM. This VRTM becomes the driver to the contractors' DT&E program. The contractor MTP will be initially developed under the "PLANS" column above. It will show traceability to the project specification VRTM and allocate the verification requirements to a test phase and test procedure. After procedures are developed, "TEST IMPLEMENTATION" occurs which has three elements (Conduct, Direct, Monitor). After test implementation, test reports are generated.

(2) DEVELOPMENT TEST AND EVALUATION TEST REQUIREMENTS SOURCES MATRIX. The matrix provided in Figure A3-4 shows the primary sources to be reviewed when compiling test requirements in the form of Test VRTM's in the DT&E Test Plans. Sources are priority listed for test requirements content. The matrix also includes examples of other supporting documents that shall be considered for review even though they are not primary sources for test requirements.

Figure A3-4. Development Test and Evaluation (DT&E)
Test Requirements Sources Matrix

Source of Test Requirements	Organization Responsible for Maintaining Source Document
Subsystem specification and SOW	AND/ARD/ANS-200 (PM)
ICD/IRD (VRTM)	ASE-600, AND/ARD/ANS-200 (PM)
Computer Program Functional Specification (CPFS)	ATR - PM
Other Supporting Documents - Examples: FAA orders Plans (test, program) Contract Working Papers Memoranda of Agreement Operational Concept Documents Reference: Appendix Part 7 paragraph 1 and Figure 7-1, DT&E Component Checklist	Various organizations Various organizations Contractor Various organizations Various organizations
Previous Concept or Demonstration Test and Evaluation Phase Data	PM

c. MATRICES FOR PRODUCTION ACCEPTANCE TEST AND EVALUATION (PAT&E). The matrices shown in Figures A3-5 and A3-6 apply to PAT&E testing.

(1) PRODUCTION ACCEPTANCE TEST AND EVALUATION RESPONSIBILITY MATRIX. The matrix responsibilities shown in Figure A3-5 indicate appropriate FAA organizations that must take some action relative to PAT&E. Each organization separated by a comma must perform the same action. Organizations separated by a slash and the corresponding FAA ACT, ACN, ACW or ACD test support organization will perform the action only when the NAS subsystem is being supported by that organization.

Figure A3-5. Production Acceptance Test and Evaluation (PAT&E) Matrix #

ACTION	REQUIREMENTS #	PLANS	PROCEDURES	TEST	REPORTS
PREPARE	PM	Contractor	Contractor		Contractor
REVIEW	ATR,ATQ-1 ** , ASU,APMT,AFS	PM,QRO,APMT, COTR,ATQ-1 ** , ASU	PM,QRO,APMT, COTR,ATQ-1 ** , ASU		PM,QRO,APMT, COTR,ATQ-1 ** , ASU
APPROVE	AND/ASD/AAF CCB	CO	CO		CO
DISTRI- BUTION	ASM,AHT, plus above	ASM,ATR,AFS, plus above	ASM,ATR,AFS, plus above		ASM,ATR,AFS, plus above
DIRECT				Co (PM)	
CONDUCT				Contractor	
MONITOR				APMT,ASU,ATR, AFS,ATQ-1 ** , QRO	

** MA's and subsystems designated for IOT&E oversight only.

Explanation of Matrix - The requirements for PAT&E are generated by the PM in a project specification or purchase description which contains a project specification VRTM. This VRTM becomes the scope to the contractor's PAT&E program. The contractor will generate separate factory or site, and/or both, acceptance test plans and procedures that are to be used for production articles (post first article testing). After procedures are developed "Test Implementation" occurs which has three elements (Conduct, Direct, Monitor). After test implementation, test reports are generated.

(2) PRODUCTION ACCEPTANCE TEST AND EVALUATION TEST REQUIREMENTS SOURCES MATRIX.
The matrix provided in Figure A3-6 shows the primary sources to be reviewed when compiling test requirements in the form of Test VRTM's in the PAT&E Test Plans. Sources are priority listed for test requirements content. The matrix also includes examples of other supporting documents that shall be considered for review even though they are not primary sources for test requirements.

Figure A3-6. Production Acceptance Test and Evaluation (PAT&E)
Test Requirements Sources Matrix

Source of Test Requirements	Organization Responsible for Maintaining Source Document
Subsystem specification and SOW	AND/ARD/ANS-200 (PM)
NDI Proposal Submittal Data	Contractor
Program Implementation Plan	PM, Regions
Other Supporting Documents - Examples: FAA orders Contract Working Papers Purchase Descriptions Program Directives NAILS Plan Integrated Logistics Support Analysis Installation and Checkout Plans Memoranda of Agreement Operational Concept Documents	Various organizations Contractor PM PM PM Contractor Contractor Various organizations Various organizations

d. MATRICES FOR OPERATIONAL TEST AND EVALUATION (OT&E) INTEGRATION AND OPERATIONAL TEST. The matrices shown in Figures A3-7 and A3-8 apply to OT&E Integration and Operational testing.

(1) OPERATIONAL TEST AND EVALUATION INTEGRATION AND OPERATIONAL TEST RESPONSIBILITY MATRIX. The matrix responsibilities shown in Figure A3-7 indicate appropriate FAA organizations that must take some action relative to OT&E Integration and Operational tests. Each organization separated by a comma must perform the same action. Organizations separated by a slash and the corresponding FAA ACT, ACN, ACW or ACD test support organization will perform the action only when the NAS subsystem is being supported by that organization.

Figure A3-7. OT&E Integration and Operational Test Matrix #

ACTION	REQUIREMENTS	PLANS	PROCEDURES	TEST	REPORTS
PREPARE	APMT (IF NOT IN MTP *)	APMT	APMT		APMT
REVIEW	PM, ASE-600, ACN/ACD/ACW, ASM, ATR, AFS, ATQ-1 **, AFE ***	ACN/ACD/ACW ****, PM, ASM, ATR, AFS, ATQ-1 **, AFE ***	ACN/ACD/ACW(DIV) ****, PM, ASM, ATR, AFS, ATQ-1 **, AFE ***		ACN/ACD/ACW ****, PM, ASM, ATR, AFS, AFE ***, ATQ-1 **
APPROVE	TPRC *, APMT, ATR	PM	PM		PM
DISTRI-BUTION	ARD/ANA/ANN/ANR/ AND-30/ANC/ANW/ AAP/ANS-200 ##, plus above	ARD/ANA/ANN/ANR/ AND-30/ANC/ANW/ AAP/ANS-200##, Airway Facilities Division, regional Air Traffic Division, AAC-400, AAC-900, ASE-600, plus above	Airway Facilities Division, regional Air Traffic Division, AAC-400, AAC-900, ASE-600, plus above		ARD/ANA/ANN/ANR/ AND-30/ANC/ANW/ AAP/ANS-200] ##, Airway Facilities Division, ASU, ASE-600, regional Air Traffic Division, AAC-400, AAC-600, plus above
DIRECT				APMT, Airway Facilities Sectors, ATR	
CONDUCT				APMT, ASM + , Airway Facilities Sectors, ATR	
MONITOR				PM, ASM, ATR, AFS, ATQ-1 **	

* When additional requirements are inserted which were not identified in the approved (e.g., baselined) FAA MTP, and these additional requirements diminish the scope or quality of a test program segment, these additional requirements must be re-approved by the TPRC; otherwise the APMT and ATR can approve.

** MA's and subsystems designated for IOT&E oversight only.

*** For ANS-200 projects only.

**** Concurrence prior to review.

Explanation of Matrix. This matrix describes the FAA OT&E testing of the test requirements allocated to Integration and Operational testing in the FAA MTP (see Figure A3-2). This includes the ATR test objectives and test requirements. The Integration Test Plan will show traceability to the FAA MTP and subsequent procedures to be developed by ACN, ACW, or ACD. The Test Implementation occurs after CAI on first article. Reports on testing results are then generated for the program office.

Distribution to program director/service level for subordinate programs only.

+ASM-400/600 optional participants

(2) OPERATIONAL TEST AND EVALUATION INTEGRATION AND OPERATIONAL TEST REQUIREMENTS SOURCES MATRIX. The matrix provided in Figure A3-8 shows the primary sources to be reviewed when compiling test requirements in the form of Test VRTM's in the OT&E - Integration and Operational Test Plans. Sources are priority listed for test requirements content. The matrix also includes examples of other supporting documents that shall be considered for review even though they are not primary sources for test requirements.

Figure A3-8. Operational Test and Evaluation (OT&E)
Integration and Operational Test
Requirements Sources Matrix

Source of Integration Test Requirements	Organization Responsible for Maintaining Source Document
FAA MTP - NAS Verification Requirements	ASE, PM
PDR, CDR and DT&E Plans and Procedures - Derived OT&E	Contractor - APMT
Site Performance Criteria - Benchmark or Baseline Performance	Regional AF and AT, ASM, ATR
CPFS - Previous Management Directive (MD) Testing	ATR, ASM
Source of Operational Test Requirements	Organization Responsible for Maintaining Source Document
FAA MTP - User Groups	AAT, AAF
NAS-SR-1000, NAS-DD-1000, NAS-SS-1000	ASE
FAA Integration Test Plan	ACN/ACW/ACD
Subsystem specification	AND/ARD/ANS-200 (PM)
CPFS	ATR
Other supporting documents - Examples: FAA orders Plans (test, program) Contract Working Papers Program directives Memoranda of Agreement Operational Concept Documents	Various organizations Various organizations Contractors Various organizations Various organizations Various organizations

e. MATRICES FOR OPERATIONAL TEST AND EVALUATION SHAKEDOWN. The matrices shown in Figures A3-9 and A3-10 apply to OT&E Shakedown during the Development T&E phase.

(1) OPERATIONAL TEST AND EVALUATION SHAKEDOWN RESPONSIBILITY MATRIX. The matrix responsibilities shown in Figure A3-9 indicate appropriate FAA organizations that must take some action relative to OT&E Shakedown. Each organization separated by a comma must perform the same action. Organizations separated by a slash and the corresponding FAA ACT, ASM-400, or Aeronautical Center ASM-600 test support organization will perform the action when the NAS subsystem is being supported by the organization.

Figure A3-9. Operational Test and Evaluation Shakedown Matrix #

ACTION	REQUIREMENTS	PLANS	PROCEDURES	TEST	REPORTS
PREPARE	ASM-400/600, ATR (IF NOT IN MTP *)	ASM-400/600	ASM-400/600		ASM-400/600
REVIEW	APMT, ATR, AFS, ATQ-1 **, ANS	APMT, ATR, AFS, ANS, ATQ-1 **	APMT, ATR, AFS, ANS, ATQ-1 **		AFS, ATR, ATQ-1 **, ANS, APMT ###
APPROVE	TPRC *, ASM	ASM	ASM		ASM
DISTRI- BUTION	ASE-600, AFE ***, plus above	ASE-600, AFE ***, ACN/ACD/ACW, ASU, ARD/ANA/ANN/ANR/ ANC/ANW/AND-30/ AAP/ANS-200 ##, plus above	AFE ***, plus above		ASE-600, ASU, AFE ***, ACN/ ACD, ANA/ANN/ ANR/ANC/ANW/ AAP/ANS-30/ ANS-200 ##, plus above
DIRECT				ASM-400/600	
CONDUCT				Airway Facilities Division, regional Air Traffic Division, ATR, Airway Facilities Sector, ANS, AFS, ASM-400/600	
MONITOR				FM, APMT, ATR, ANS, Airway Facilities Sector, AFS, ATQ-1 **	

* When additional requirements are inserted which were not identified in the approved FAA MTP, and these additional requirements diminish the scope or quality of a test program segment, these additional requirements must be re-approved by the TPRC; otherwise, ASM and ATR will approve.

** MA's and subsystems designated for IOT&E oversight only.

*** For ANS-200 projects only.

Explanation of Matrix - The OT&E Shakedown matrix indicates FAA testing by "User Organizations." Although independent, the testing will include those test requirements allocated to OT&E Shakedown in the FAA MTP. Test Implementation Schedules will be constrained by those allocated in the FAA MTP. Additionally, the plans, procedures, and reports shall reflect all ATR interests.

Distribution to program director/service level for subordinate programs only.

Information only.

(2) OPERATIONAL TEST AND EVALUATION SHAKEDOWN REQUIREMENTS SOURCES MATRIX. The matrix provided in Figure A3-10 shows the primary sources to be reviewed when compiling test requirements in the form of a Test VRTM in the OT&E - Shakedown Plan. Sources are priority listed for test requirements content. The matrix also includes examples of other supporting documents that shall be considered for review even though they are not primary sources for test requirements.

Figure A3-10. Operational Test and Evaluation (OT&E)
Shakedown Requirements Sources Matrix

Source of Test Requirements	Organization Responsible for Maintaining Source Document
FAA Master Test Plan	ASM, ATR, Regional Personnel
DT&E Testing - Derived OT&E Requirements	Contractor, ASM/ATR
Order 1800.58, (NAILS Policy)	ANS-400
NAS-SR-1000, Operational Concepts	ASE, ARD
NAS-SS-1000	ASE-600
Previous Test Reports (Untested Requirements)	ACN/ACW/ACD
Subsystem Specification	ANS/ASD (PM)
CPFS	ATR
Other supporting documents - Examples: FAA orders Plans (test, program) Contractor Test Reports Memoranda of Agreement Operational Concept Documents	Various organizations Various organizations Contractors Various organizations Various organizations

f. MATRICES FOR FIELD SHAKEDOWN. The matrices shown in Figures A3-11 and A3-12 apply to Field Shakedown during the Production T&E phase.

(1) FIELD SHAKEDOWN RESPONSIBILITY MATRIX. The matrix responsibilities shown in Figure A3-11 indicate appropriate FAA organizations that must take some action relative to Field Shakedown. Each organization separated by a comma must perform the same action. Organizations separated by a slash will perform the action only when the NAS subsystem is being supported by that organization.

Figure A3-11. Field Shakedown Matrix #

ACTION	REQUIREMENTS	PLANS	PROCEDURES	TEST	REPORTS
PREPARE	Airway Facilities Division	Airway Facilities Division	Airway Facilities Division		Airway Facilities Division
REVIEW AND DISTRIBUTION	Regional Air Traffic Division, APMT, ATR, ATM, ATP, AFS, PM ## Air Traffic Facilities, ATQ-1 **	APMT, ATR, AFS, ATM, ATP, Air Traffic Facilities, ATQ-1 **	APMT, ATR, AFS, ATM, ATP, Air Traffic Facilities, ATQ-1 **		APMT, ASU, ATR, AFS, ATM, ATP, Air Traffic Facilities, ATQ-1 **
APPROVE	Airway Facilities Division	Airway Facilities Division	Airway Facilities Division		Airway Facilities Division
DIRECT				Airway Facilities Division, (regional Air Traffic Division when delegated by Airway Facilities Division)	+ Optional Participants
CONDUCT				Airway Facilities Division, regional Air Traffic Division, (ASM-400/600) +	
MONITOR				PM, APMT, ATR, Airway Facilities Sectors, ATM, ATP, regional Air Traffic Division, AFS, ASM-400/600, ATQ-1 **, Air Traffic Facilities	

** MA's and subsystems designated for IOT&E oversight only.

*** Concurrence prior to review.

Explanation of Matrix. This matrix indicates the FAA testing that occurs in the field on each field-deployed subsystem after CAI. The source of requirements for this testing are determined by regional and local site personnel. Frequently, the OT&E Shakedown scripts are site adapted. After this testing a JAI occurs with the contracting office representative from the program office. Airway Facilities Division, although preparing the plans and procedures, will include collaboration inputs from regional Air Traffic Division. These inputs will verify regional Air Traffic Division test objectives and test requirements. Airway Facilities Division will delegate direction to regional Air Traffic Division when appropriate and test implementation is verifying regional Air Traffic Division test objectives or test requirements.

Agreement on Field Shakedown Requirements will be established between regions and the PM via the Project Implementation Plan order.

(2) FIELD SHAKEDOWN REQUIREMENTS SOURCES MATRIX. The matrix provided in Figure A3-12 shows the primary sources to be reviewed when compiling test requirements in the form of a Test VRTM in the Field Shakedown Plan. Sources are priority listed for test requirements content. The matrix also includes examples of other supporting documents that shall be considered for review even though they are not primary sources for test requirements.

Figure A3-12. Field Shakedown Requirements Sources Matrix

Source of Test Requirements	Organization Responsible for Maintaining Source Document
Program Implementation Plan order	PM
OT&E Shakedown Plan, EEM, SPB	ASM-400/600
Local User Groups, SOP's, Adaptating Test Procedures	AAF, AAT, Regional
Previous Test Reports (Untested Requirements)	ACN/ACW/ACD
Site Specific Supporting Documents	Various organizations

g. PROGRAM DIRECTIVE GUIDANCE RESPONSIBILITIES. The responsibilities for preparation, review, and approval of the PD is shown in the matrix of Figure A3-13, Responsibility Matrix for Program Directives (PD's). Each organization separated by a comma must perform the same action. Organizations separated by a slash will perform the action only when the NAS subsystem is being procured by that organization.

Figure A3-13. Responsibility Matrix for Program Directives (PD's)

	PD APMT	PD ASM	PD ASU	PD Regions Airway Facilities Division	PD ANS	PD ATR/AFS
PREP-ARATION	APMT	APMT ***	APMT	APMT	APMT	APMT
REVIEW	PM, ACN/ACD, ASM, ATR, AFS, ASU	ACN/ACD/ACW, PM, ASM	ACN/ACD/ACW, PM, ASU	ACN/ACD/ACW, PM, Airway Facilities Division	ACN/ACD/ACW, PM, ANS	ACN/ACD/ACW, PM, ATR/AFS, [ATM, ATP, Regional Air Traffic Division, Air Traffic Facilities via ATR/AFS]
APPROVE	PM, APMT	PM, ASM	PM, ASU	PM, Airway Facilities Division	PM, ANS	PM, ATR/AFS
DISTRI-BUTION	ANA/ANN/AND-30/ ANR/ANC/ANW/ AAP/ANS-200 #, AAF, ATM, ATP, AFE **, ATQ-1 *, ASE-600, plus above	ARD/ANA/ANN/ ANC/AND-30/ ANR/ANW/AAP/ ANS-200 #, ASU, ATR, AFS ATQ-1 *, AFE **, plus above	ARD/ANA/ANN/ ANC/AND-30/ ANR/ANW/AAP/ ANS-200 # , ASM, ATR, AFS, ATQ-1 * , AFE** plus above	ARD/ANA/ANN/ ANC/AND-30/ ANR/ANW/AAP/ ANS-200 # , ASM, ASU, ANS, ATR, ATQ-1 * AFS, regional Air Traffic Division, AFE **, Plus Above	ARD/AAP/ANA/ ANN/ANC/ AND-30/ANR/ ANW/ANS-200 #, ASM, ASU, Airway Facilities Division, regional Air Traffic Division, ATR, AFS, ATQ-1 * , AFE **, plus above	ARD/AAP/ANA/ ANN/ANC/ AND-30/ANR/ ANW/ANS-200 #, ASM, ASU, ATQ-1 * , plus above

Distribution to program director/service level for subordinate programs only.

* MA's and subsystems designated for IOT&E oversight only.

** For ANS-200 projects only.

*** ASM will provide an original draft of the PD to the APMT, and approval of the final version will be between the PM and ASM.



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PART 4. TEST AND EVALUATION POLICY IMPLEMENTATION

A. Concept Test and Evaluation Phase. In the Concept T&E phase, users further define their operational requirements contained in the MNS. Operational requirements are verified to the extent of establishing their legitimacy. The T&E methodology is flexible, but should result in the establishment that a formal operational requirement for a system exists and that the requirement has been properly translated into a system design concept. Verification of the system design concept entails exploration of the feasibility of alternative concepts with user participation. Technical risk assessments for the various concepts would be made on the basis of cost, implementation schedule, maturity of the technology to be used in the hardware or software system design, and the transition approach for the design to be integrated into the NAS while maintaining operational services. The following task descriptions provide guidance for this T&E phase.

(1) Mission Need Statement for National Airspace System (NAS) Program. NAS program is initiated.

(2) Appoint Program Manager (PM). ARD, ANA, ANN, ANC, ANR, ANW, AAP, AND-30, or ANS-200 provides a PM.

(3) Appoint Associate Program Manager for Test (APMT). ACN, ACW, or ACD provides an APMT.

(4) Prepare Program Directive (PD). The PM arranges for test coordination, monitoring, and conduct with the APMT. Responsibility guidance relative to PD's is provided in Part 3 of this appendix. This PD is updated on an annual basis.

(5) Develop T&E Strategy for NAS Program. A T&E strategy is developed, which determines the overall DT&E/PAT&E and FAA OT&E implementation approach.

(6) Initiate FAA Master Test Plan (MTP). The PM and APMT initiate the FAA MTP in accordance with the current version of FAA-STD-024, Preparation of T&E Documentation. The FAA MTP at this stage describes the T&E strategy for the DT&E, OT&E, and eventual PAT&E responsibilities, such as test locations, schedules, and critical issues. The FAA MTP shall clearly indicate the goals and objectives for the Concept test phase that will be verified by the T&E program.

(7) Prepare Program Directives for Test and Evaluation Support. The APMT prepares PD's between the program office and other FAA organizations. The purpose of the PD is to define organizational responsibilities in support of various aspects of the T&E activities. Responsibilities relative to the T&E process and preparation of the PD is provided in Part 3 of this appendix.

(8) FAA Master Test Plan (MTP) Approval. The PM submits the FAA MTP via the secretariat to the TPRC for approval prior to contract award. For MA's and subsystems designated for IOT&E oversight ATQ will have co-approval authority.

(9) Implement Concept T&E Phase. Users/contractors assist in the evaluation of whether an operational requirement can be formally identified in terms of system hardware and software characteristics. Alternative concepts are also evaluated.

B. Demonstration Test and Evaluation Phase. In the Demonstration T&E phase, functional and performance requirements are validated through iterative demonstrations on models for conformance to the operational requirements and consistency with the system design concept. As the design progresses, the functional and performance specification is translated into successively more refined baselines. Each of these baselines, including the initial specification is evaluated to verify that requirements are testable and consistent. T&E is performed to show systematically that each baseline meets stated criteria and that derivative requirements are accurately an extension of the previous baseline specification. All requirements are verified to be traceable to higher and lower level specifications. The following task descriptions provide guidance for this T&E phase.

(1) Demonstration T&E Phase NAS Program Continuation. The NAS program is continued based on meeting objectives of the previous T&E phase.

(2) Develop T&E Strategy for Demonstration T&E Phase. A T&E strategy is developed or revised, whichever is appropriate. This will determine the overall DT&E and FAA OT&E implementation approach for this and subsequent T&E phases.

(3) Develop or Revise the FAA Master Test Plan (MTP). The PM and APMT develop or revise the FAA MTP in accordance with the current version of FAA-STD-024, Preparation of Test and Evaluation Documentation. The FAA MTP is revised to describe the T&E results from the previous phase of testing and the updated strategy for this phase. The FAA MTP also indicates the objectives for this acquisition phase and describes the DT&E, and FAA OT&E responsibilities, test locations, schedules, critical issues, and the operational requirement goals and objectives that will be verified during the Demonstration T&E phase.

(4) Prepare Program Directives for T&E Support. The APMT prepares PD's between the program office and other FAA organizations. The purpose of the PD is to define organizational responsibilities in support of various aspects of the T&E activities. Responsibilities relative to the T&E process and preparation of PD's is provided in Part 3 of this appendix.

(5) FAA Master Test Plan (MTP) Approval. The PM submits the FAA MTP via the secretariat to the TPRC for approval prior to contract award. For MA's and designated subsystems ATQ will have coapproval authority.

(6) Implement Demonstration T&E Phase. Users/contractors assist in the evaluation of whether operational requirements have been identified in terms of system hardware and software characteristics in a baselined system specification.

C. Development Test and Evaluation Phase. An overview of the T&E process each program is to undertake is depicted in Figure 4-1, Overview of T&E Process for Development Phase. The following task descriptions detail the implementation of the FAA T&E program for this T&E phase. Refer to Figure 4-2, T&E Implementation Flow Diagram for Development Phase, and correlate the following subparagraph to those in the diagram to more completely understand the sequencing of T&E activities. The flow diagram shows that many T&E activities are accomplished in a parallel rather than a serial manner. The top sequence depicts the DT&E/PAT&E flow whereas the bottom sequence corresponds to the OT&E flow.

(1) Development T&E Phase NAS Program Continuation. The NAS program is continued based on meeting objectives of the previous T&E phase.

(2) Develop T&E Strategy for Development T&E Phase. A T&E strategy is developed or revised, whichever is appropriate. This will determine the overall DT&E and FAA OT&E implementation approach.

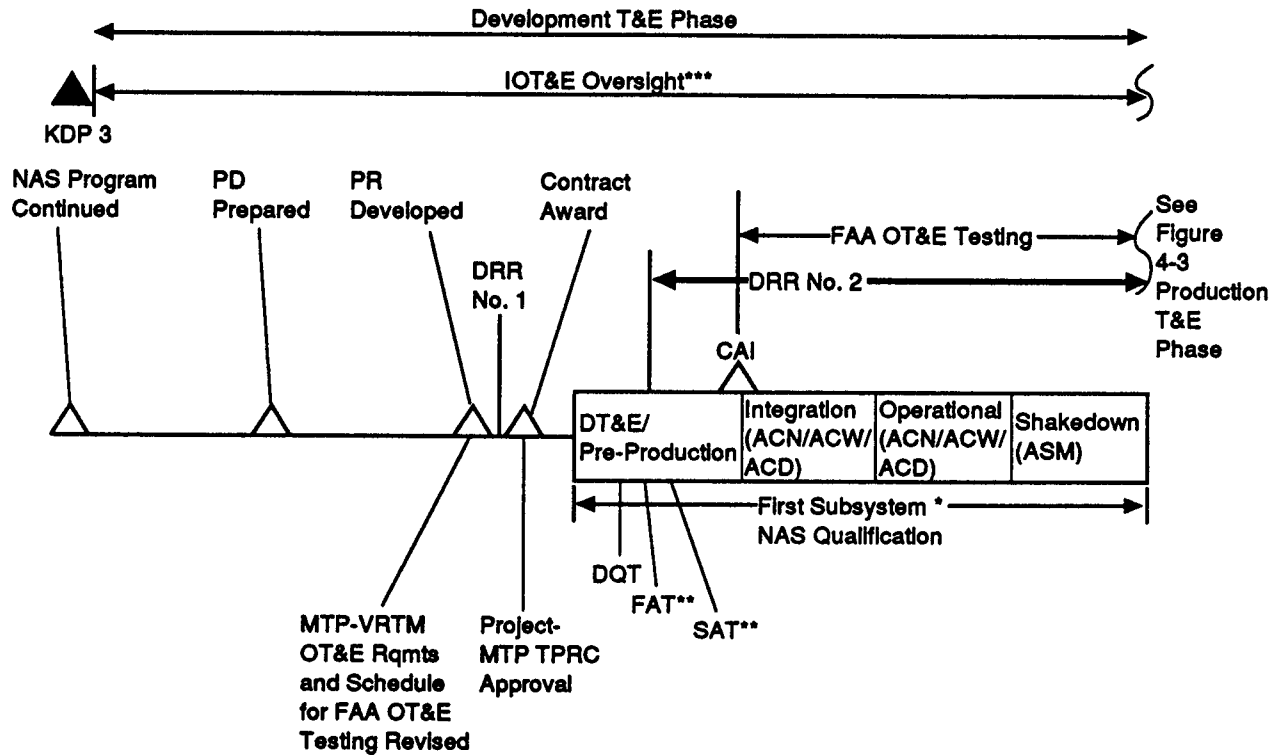
(3) Develop or Revise the FAA Master Test Plan (MTP). The PM and APMT develop or revise the FAA MTP in accordance with the current version of FAA-STD-024, Preparation of Test and Evaluation Documentation. The FAA MTP is revised to describe the T&E results from the previous phase of testing and the updated strategy for this phase. The FAA MTP also clearly indicates the objectives for this acquisition phase and describes the DT&E, Pre-production and FAA OT&E responsibilities, test locations, schedules, critical issues, and operational requirement goals and objectives that will be verified during the Development T&E phase.

(4) Prepare PD's for Test and Evaluation (T&E) Support. The APMT prepares the PD between the program office and other FAA organizations. The purpose of the PD is to define organizational responsibilities in support of various aspects of the T&E activities. Responsibilities relative to the T&E process and preparation of the PD is provided in Part 3 of this appendix.

(5) Develop Operational Test and Evaluation Integration and Operational Test Requirements and Schedule-Durations. The PM and APMT develop the OT&E Integration and Operational test requirements and test implementation schedule-durations. The Integration test requirements are developed by evaluating the feasibility of testing NAS System Specification (NAS-SS-1000) VRTM's that have been provided by ASE-600 for inclusion in the FAA MTP. For those programs without NAS-SS-1000 system requirements the PM will coordinate with ASE for OT&E Integration test requirements. Operational test requirements may be developed from existing NAS operational data/documentation, operational issues, and degraded operational test scenarios identified by the FAA user operating organizations (normally ATR and ASM), as well as key regional Airway Facility and Air Traffic division personnel.

(6) Develop Operational Test and Evaluation' Shakedown Requirements and Schedule-Durations. The ASM organization develops the OT&E Shakedown requirements and test implementation schedule-durations. ASM will coordinate with ATR, Airway Facilities, and key regional Airway Facilities personnel in this development of Shakedown requirements and schedule-durations. Supportability operational guidance issues for Shakedown will be provided by ANS and included in the FAA MTP.

Figure 4-1 Overview of T&E Process for Development Phase



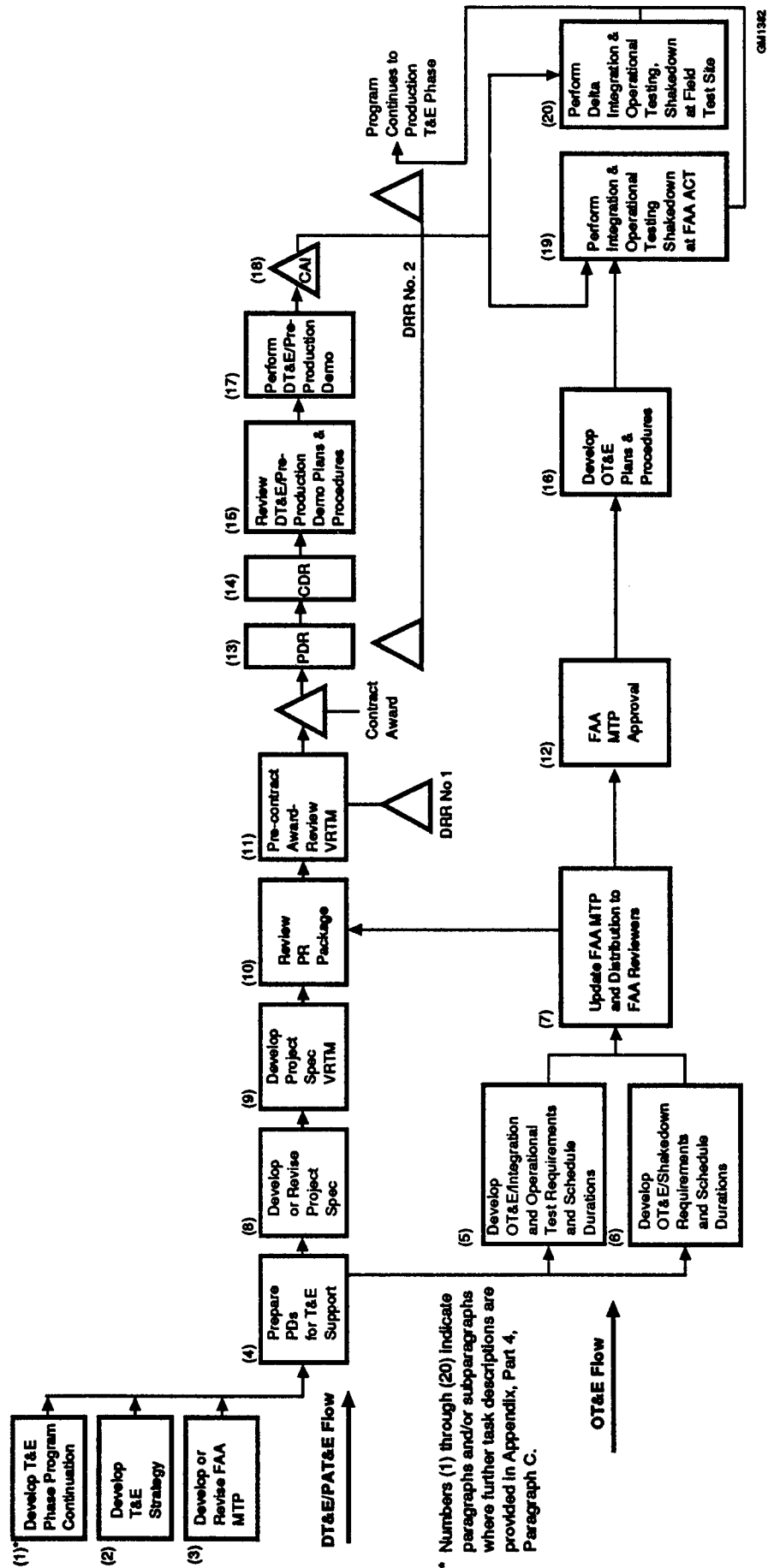
* First subsystem may consist of several subsystem articles. Usually, the first is sent to the FAA ACT and the second to a test operational site (key site).

** Factory pre-production will be limited to additional first articles, long-lead items/components or rework, until OT&E testing has been completed, and the KDP4 and deployment decision have been made.

*** IOT&E Oversight is performed only on designated major acquisitions and subsystems.

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Figure 4-2 Implementation Flow Diagram for Development Phase



(7) Update FAA Master Test Plan (MTP) and Distribute to FAA Reviewers. The PM and APMT update the FAA MTP with the OT&E Integration and Operational test requirements and schedule-durations developed per Part 4 paragraph C.e. The PM and APMT update the FAA MTP with the OT&E Shakedown requirements and schedule-durations provided by ASM and developed per Part 4 paragraph C.f. The PM will distribute the revised FAA MTP to FAA organizations (as specified in Part 3, Figure A3-1 and Part 5 of the appendix) for review of the document.

(8) Develop or Revise the Project Specification. The PM develops or revises the project specification. The requirements for a CIP project shall be traceable to the NAS-SS-1000 Volume 1, Appendix III and Volumes II through VI. A T&E review shall ensure that each design requirement is verifiable and can be distinguished from other requirements.

(9) Develop Project Specification Verification Requirements Traceability Matrix (VRTM). The PM develops the project specification VRTM for inclusion in the Quality Assurance section of the project specification after the functional and performance requirements have been formulated in the project specification. Interface Requirements Documents (IRD's) or Interface Control Documents (ICD's) VRTM's are adapted depending on availability of the interfacing NAS subsystem.

(10) Review Procurement Request (PR) Package. The DT&E/PAT&E, OT&E support, T&E CDRL items, SOW T&E Government Furnished Equipment (GFE) elements of the Procurement Request (PR) package are reviewed as part of the DRR, number 1. Also, the PR package is reviewed to ensure that it reflects the OT&E schedule-durations that occur after CAI. Those programs with a Production phase option can thereby plan for an anticipated deployment decision and contractor PAT&E turn-on. The APMT provides support to the PM for this task.

(11) Pre-Contract Award Review of Project Specification Verification Requirements Traceability Matrix (VRTM). The project specification VRTM and scope of contractor testing are established prior to contract award through a review procedure set by the PM and the APMT. The DT&E and pre-production process is formalized at contract award, and more clearly defined in the project specification VRTM and SOW. Modification to the project specification VRTM shall become a modification to the project specification.

(12) FAA Master Test Plan (MTP) Approval. The PM submits the FAA MTP via the secretariat to the TPRC for approval prior to contract award. For MA's and subsystems designated for IOT&E oversight, ATQ-1 will have co-approval FAA MTP authority.

(13) Preliminary Design Review (PDR). At the PDR, the contractor's MTP (as distinguished from the FAA MTP) covering DT&E and PAT&E should be provided to the PM and APMT. It shall show traceability to the project specification VRTM and shall show the allocation of testing of the specification requirements to specific factory or field test site plans.

(14) Critical Design Review (CDR). The contractor's DT&E and pre-PAT&E test plans, including identification of test procedures to be developed, are baselined at CDR. The contractor's design for hardware and software are also baselined at the CDR.

(15) Review Development Test and Evaluation (DT&E) and Pre-Production Demonstration Plans and Procedures. The contractor develops test plans and procedures for DT&E and pre-production or pre-PAT&E.

(16) Develop Operational Test and Evaluation (OT&E) Plans and Procedures. The APMT develops the OT&E Integration and Operational test plans and procedures and ASM develops the Shakedown plans and procedures. Both the APMT and ASM coordinate with ATR and Flight Standards Service (AFS), to ensure all test requirements and objectives identified in the FAA MTP have been included in the OT&E plans and procedures. Other Air Traffic organizations, as designated by ATR, participate actively by providing inputs, monitoring, and reviewing the Integration and Operational testing and Shakedown verification and validation.

(17) Perform Development Test and Evaluation (DT&E) and Pre-Production Demonstration Implementation. The contractor performs DT&E qualification testing and demonstrates satisfactorily pre-PAT&E procedures by conducting acceptance testing during pre-PAT&E article factory-to-site processing. Subsystem contractor qualification may comprise several pre-PAT&E test articles prior to CAI and the OT&E testing is usually accomplished at the FAA ACT, as well as a field test site. All T&E testing is conducted per approved test procedures.

(18) Contract Acceptance Inspection (CAI). This is the time-event that denotes when the contractor has completed the DT&E and pre-PAT&E test phase on the contracted hardware or software. Successful completion of DT&E and pre-PAT&E results in transfer of ownership of the subsystem to the FAA. Subsequent articles used for NAS T&E qualification undergo the pre-PAT&E process which culminates in a CAI for each subsystem contract item. It is the PM's option to have the contractor participate in field installation, checkout, and site acceptance testing for each contract item. In those instances when the contractor will not be required to do site acceptance, the CAI will occur at the factory, or upon receipt at the depot, or other designated delivery location.

(19) Perform Operational Test and Evaluation; Integration and Operational Testing and Shakedown at the FAA Technical Center. The APMT conducts OT&E Integration and Operational testing. ASM determines the extent of OT&E Shakedown to be accomplished at the FAA ACT. The testing occurs with the coordination and support of ATR.

(20) Perform Delta Operational Test and Evaluation; Integration and Operational Testing and Shakedown at the Field Test Site. The APMT will determine what Integration and Operational test requirements must be tested in the NAS, at a field test site. These are test requirements that cannot be tested at the FAA ACT. ASM determines the extent of Shakedown requirements to be accomplished at the field test site. The test implementation occurs with the coordination and support of regional Airway Facility and Air Traffic division personnel.

D. Production Test and Evaluation Phase. The following task descriptions detail the implementation of the Production T&E phase. An overview of the T&E process is depicted in Figure 4-3, Overview of T&E Process for Production Phase.

(1) Production T&E Phase National Airspace System Program Continuation. The NAS program is continued based on meeting objectives of the previous T&E phase.

(2) Deployment Decision. ACN, ACW, or ACD (as appropriate) will provide the test results of T&E testing and a deployment assessment to the DRR. The test results provided will include inputs on OT&E Shakedown provided by ASM, who will coordinate with ATR and AFS for this input. Prior to the deployment decision, the TPRC will resolve T&E issues when agreements cannot be reached at lower levels of FAA management.

(3) Implement Production Acceptance Test and Evaluation (PAT&E). PAT&E is conducted by the contractor at the factory and consists of a FAT that was demonstrated during the development T&E phase. For each field deployment site, when the contract is termed "turn-key," the contractor will conduct field installation, checkout and a site acceptance test (SAT). For certain projects, field installation and checkout will be conducted by the FAA.

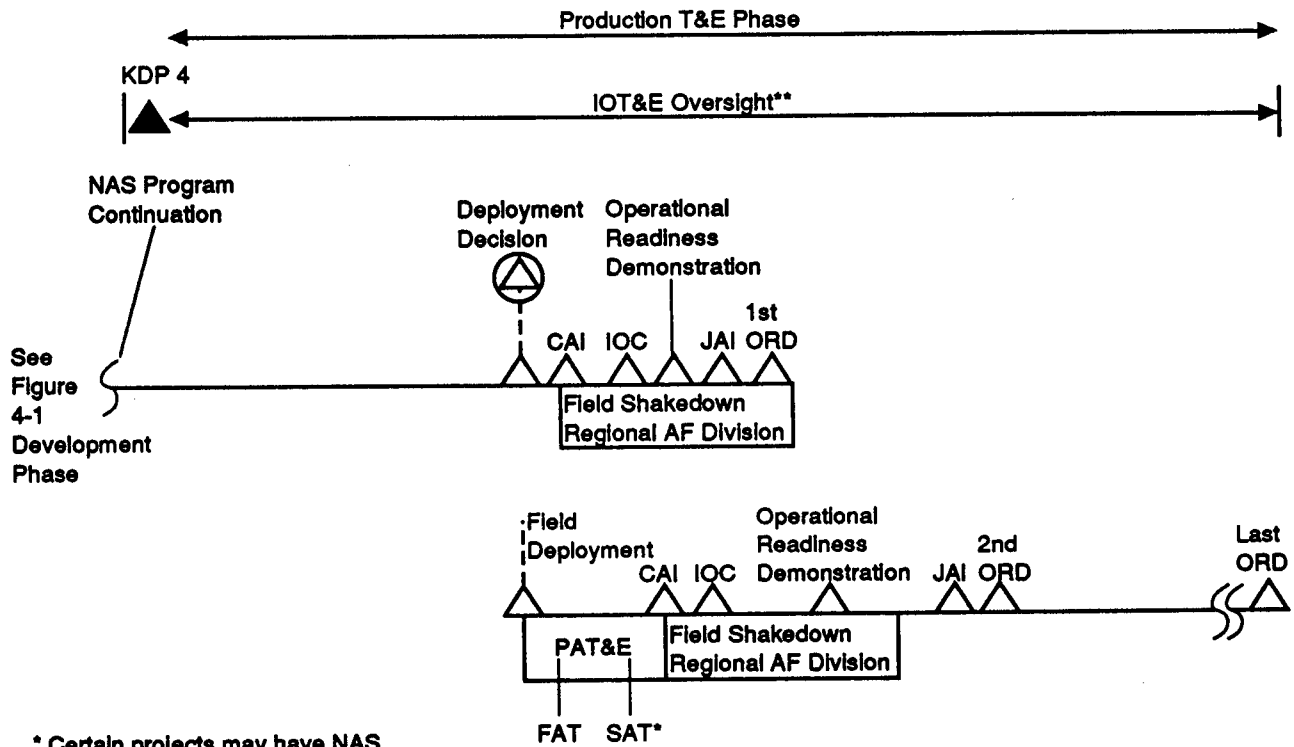
(4) Field Shakedown - Field Test Site. FAA regional or local personnel conduct Field Shakedown after OT&E Shakedown has been completed at the field test site. The FAA regional and local personnel demonstrate proficiency to completely maintain and operate the new NAS subsystem equipment at the field test site, when required during a period of time called IOC. This time period transitions into an Operational Readiness Demonstration. Incremental JAI's occur. These activities are further identified in Order 6030.45, Facility Reference Data File.

(5) First Operational Readiness Date (ORD). The Operational Readiness Demonstration conducted as part of Field Shakedown culminates in a program milestone called ORD.

(6) Conduct Field Shakedown - Field Sites. FAA regional or local personnel conduct Field Shakedown after PAT&E site acceptance testing and a contractor milestone called CAI, or after the FAA has completed installation and checks of the new NAS subsystem at each field site location. Field Shakedown is conducted whereby FAA regional and local personnel demonstrate proficiency to completely maintain and operate each subsystem deployed to each field site in the NAS and a JAI has occurred, the subsystem transitions to operational services, when required from IOC to Operational Readiness Demonstration.

(7) Operational Readiness Date (ORD) - Field Sites. The time-event called ORD after completion of the Operational Readiness Demonstration. The last deployed site ORD is another major project milestone.

Figure 4-3 Overview of T&E Process for Production Phase



* Certain projects may have NAS subsystems installed by FAA personnel rather than the contractor.

** IOT&E Oversight is performed only on designated major acquisitions and subsystems.

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PART 5. TEST POLICY REVIEW COMMITTEE OPERATING PROCEDURES1.0 Purpose

The purpose of this guide is to provide PM's and FAA ACT APMT's a quick reference with regard to the review and distribution of FAA MTP's, policy waivers, and changes to approved FAA MTP's.

2.0 Process

The following is the general procedure that should be followed with regard to the review, distribution, and approval of TPRC documentation such as FAA MTP's, policy waivers, and changes to approved FAA MTP's.

- a. The PM/APMT prepare the document (FAA MTP, policy waiver, or FAA MTP changes requiring TPRC approval). For policy waivers the PM/APMT prepares the memorandum with the program director's or service level manager's signature.
- b. Before the FAA MTP is sent for NAS clearance it must be of sufficient quality and conformance to this order to warrant release for further review. The following checklist will be used by the PM and APMT as additional guidance on the development of the FAA MTP:
 1. Cover Sheet of the MTP will contain the signature and organization of the PM and APMT.
 2. NAS-SS-1000 VRTM requirements must be reviewed or provided by ASE-600 and included in the MTP. These requirements will be reviewed by the APMT for test implementation feasibility. Those requirements that cannot be tested must be indicated in the VRTM as being deferred. Rationale as to why the requirements are deferred must also be contained in the MTP.
 3. DT&E and OT&E planning relative to NAS interfacing subsystems must thoroughly be addressed in the MTP, including coordination with projects concurrently under contract.
 4. ASU, ASM, and ATR OT&E requirements will be included in the MTP (if applicable). These include degraded operations testing and any FAA Flight Inspection testing that may be required.
 5. Based on the OT&E requirements identified in the MTP there will be OT&E Integration and Operational testing and Shakedown schedule-durations (time length of an each activity). These schedule-durations shall be time-phased to reflect a completely integrated schedule to level 1 program milestones including acquisition (ARC if applicable) and DRR milestones. Dates are recognized to be dynamic, and therefore only major program milestone dates need to be indicated in the MTP.

6. The APMT signature on the cover attests that the MTP:
 - a) reflects the contractor's DT&E and PAT&E (if applicable) responsibilities.
 - b) contains OT&E Integration and Operational requirements and schedule-durations for FAA ACT and Field Test Site (if required), and has concurrence by ATR.
 - c) contains the scope of OT&E Shakedown requirements and schedule-durations for FAA ACT and Field Test Site and has concurrence by ASM and ATR.
7. Subsequent to approval of the MTP by the TPRC, sub-tiered OT&E Integration and Operational test and Shakedown Plans/Test-Durations and Procedures must maintain traceability to the OT&E requirements and schedule-durations identified in the MTP. When additional OT&E requirements are identified (as the project design becomes clearer) by the APMT, ASM, ANS, or ATR, these may be included in the sub-tiered OT&E Test Plans. When these additional requirements exceed the capacity of the OT&E schedule or exceed the OT&E test implementation costs borne by the PM and based on the baselined MTP, these impacts must be brought to the TPRC in the form of an update to the MTP for approval.
- c. The PM prepares a clearance record for the document that includes the following organizations:

Must Reviewers:
[ARD/ANA/ANN/ANR/ANC/ANW/AND-30/AAP/ANS-200]*, ASM,
ASU, ASE, ANS, AAF-11, ACN/ACW/ACD, ATR, AFS, ATQ**,
AND-6 (DOD Representative)***, AND-3, AFE****,
[regional Airway Facilities Division, regional Air
Traffic Division]*****

* Appropriate program director or division manager for the project request under discussion.
** For MA's and subsystems designated for IOT&E oversight only.
*** AND-6 point-of-contact for DOD representative on joint procurements only.
**** For ANS-200 projects only.
*****Review of MTP required by all potential "Field Test Site" locations' regional Airway Facilities Division and Air Traffic Division personnel.

Information copies:
Regional Airway Facilities Division, regional Air Traffic
Division, AAC-400, ACT, AAC-900, ATH,
[Airway Facilities Sectors and Air Traffic
Facilities (field)]

- d. Include on the clearance record, in the box labeled "Reason for Attached," a note which reads "Return comments to the program manager for action and to ASE-600 for information."
- e. The PM submits the clearance record and copy of the document to ASE-600 for initialing prior to distribution.
- f. After the clearance record is initialed by ASE-600, the clearance record is signed out by the division manager or program director of the originating office. Also include on the clearance record a "Deadline Date," allowing at least 3 weeks for review.
- g. After the clearance record is signed by the division manager or program director, the PM reproduces enough copies of the clearance record and document to distribute to all organizations listed in Part 5 paragraph 2.c.
- h. The PM distributes the clearance record and document.
- i. The organizations listed in Part 5 paragraph 2.c above return comments to the PM for action and to ASE-600 for information.
- j. The PM/APMT work off all nonconcurs and all comments from concur w/comment responses.
- k. The PM prepares a disposition of all comments that includes:
 - The commenting organization
 - The comment
 - How it has been accommodated or why it has not been accommodated
- l. The PM updates the document incorporating all comments as appropriate and provides a copy of the updated document to the APMT.
- m. The PM arranges to be placed on the next TPRC agenda by contacting ASE-600.
- n. The PM prepares a presentation for the TPRC that provides the information as indicated for the T&E documents below:
 - [FAA MASTER TEST PLANS]
 - * Overview of the MTP that addresses the following:
 - Mission Need Statement of the program.
 - Current NAS System Capability (as applicable)
 - Planned Program Capabilities
 - NAS Interoperable-Subsystems Configuration Diagram
 - General Test Overview
 - Summarize T&E (DT&E/OT&E) results to date
 - Describe T&E (DT&E/OT&E) for the present program T&E phase
 - List responsible test organizations for current T&E phase
 - Describe operational software development relative to the subsystem operating in the NAS

- Identify those programs not available for integration testing because of acquisition considerations
- Describe the program methodology for implementation of deferred requirements
- Identify transitional interfaces required to allow interfacing to the existing NAS
- Identify T&E issues/concerns
- Integrated Schedule Overview
 - T&E schedule-durations and DRR T&E related milestones
 - Major acquisition program milestones
 - Future T&E phase revision to the MTP
- MTP Issues
 - Provide a list of reviewers and summary of all comments received with emphasis on comments not incorporated into the MTP with supporting rationale.
- MTP Recommendation for Approval by the TPRC

[POLICY WAIVERS]

- * Overview of policy waiver request that addresses:
 - Specific identification of waiver or deviation from the T&E policy requested.
 - Rationale to support waiver/deviation request.
 - Disposition summary of all comments received.
 - Impact if waiver/deviation request is not approved.

[CHANGES TO TPRC APPROVED MASTER TEST PLANS]

- * Briefing that addresses the following:
 - Description of the change(s).
 - Statement as to why the changes are necessary.
 - Disposition summary of all comments received.
 - Indication that all comments received have been resolved or an explanation why the comment(s) cannot be accommodated.

- o. The PM provides the TPRC secretariat, ASE-600, the updated document and TPRC briefing package at least 2 weeks prior to the scheduled TPRC meeting date. The PM will provide 30 copies of the updated document and briefing package to ASE-600 for distribution with the meeting agenda.

3.0 Point of Contact for Further Information

If additional information is needed please contact ASE-600.

PART 6. PROJECT SPECIFICATION VERIFICATION REQUIREMENTS TRACEABILITY
MATRICES AND FAA MASTER TEST PLAN VERIFICATION REQUIREMENTS
TRACEABILITY MATRICES

1. PROJECT SPECIFICATION VERIFICATION REQUIREMENTS TRACEABILITY MATRIX (VRTM). The purpose of the project specification VRTM is to specify primarily the expected contractor testing requirements for qualification of the designed Hardware/Software in satisfying the functional and performance requirements contained in the FAA system/segment project specification. The information for preparation of the project specification VRTM is given in FAA-STD-005d, Preparation of Specification Documents. The standard 005 refers to a Data Item Description (DID) "DI CMAN 80008" which requires a Qualification Cross Reference Matrix.

a. If a requirement is validated by test during first article qualification testing and the requirement has enough significance that it is "retested" during acceptance test, then this acceptance testing can be indicated in the VRTM as a Demonstration.

b. In general, software functional requirements are validated by demonstration since the functionality must be observed through some secondary media.

c. An extension of the project specification VRTM verification requirements are contained in IRD's. The test requirements contained in the IRD VRTM must be tailored for responsibilities intended to be levied on the contractor.

2. EXAMPLES OF PROJECT SPECIFICATION VERIFICATION REQUIREMENTS TRACEABILITY MATRICES (VRTM's).

a. Project Specification Verification Requirements Traceability Matrix (VRTM) Example from Terminal Doppler Weather Radar (TDWR) Specification FAA-E-2806a.

VERIFICATION REQUIREMENTS TRACEABILITY MATRIX

Section 3: Requirements Paragraph Reference		Verification Test Levels and Methods					
		DT&E		Production		Acceptance Testing	
		In-Plant	On-Site	In-Plant			
		Paragraph	Title	DQT	DQT/ TFT&E	PAT&E	
10.	Purpose						Description
10.1	Product Generation and Transmission	T	T			D	
10.1.1	Product Priority	T	T			D	
10.1.2	Product Distribution	T	T			D	
10.2	Microburst Product	AD	D			D	
10.2.1	Performance Design Goal	A					
10.3	Gust Front Product	AT	D			D	
10.4	N/U						
10.5	Precipitation Product	D					
10.5.1	Levels	T	D			D	Based on available conditions
10.5.2	Computation of Precipitation Product						Title
10.5.2.1	Base Data Used	T	D			D	
10.5.2.2	Update Rate	T	D			D	
10.5.2.3	Product Format	T	D			D	
10.5.2.4	Definition of Cell Value	A					
10.5.3	Attenuation	AT					
20.1	Introduction						Description
20.1.1	Situation Display Reqs.						Title
20.1.1.1	General Requirements						Title
20.1.1.1.1	Size	I	I				
20.1.1.1.2	Start-up Characteristic	D	D			D	
20.1.1.1.3	Memory	D	D				
20.1.1.1.4	Environment	T	T				
20.1.1.1.5	Reactability	D	D			D	
20.1.1.1.6	Lifetime	A					
20.1.1.1.7	Color	D	D				
20.1.1.1.8	Protection of Display Adaptation Parameters	D	D			D	
20.1.1.2	Message Types						Title
20.1.1.2.1	Alphanumeric	D	D	D		D	
20.1.1.2.2	Graphic	T					

Verification Methods: T=Test, D=Demonstration, A=Analysis, I=Inspection, N/U=Not Used

b. Project Specification Verification Requirements Traceability Matrix (VRTM)
Example from National Airspace Data Interchange Network (NADIN) II Specification
FAA-E-2770b.

VERIFICATION REQUIREMENTS TRACEABILITY MATRIX (VRTM)

Section 3 REQUIREMENTS PARA. REFERENCE FOR DOCUMENT FAA-2770		VERIFICATION LEVEL AND METHOD						Remarks
		FACTORY (4.3)			SITE (4.4)			
		COTS (4.3.1)	DQT (4.3.2)		OT&E (4.4.1)	INTEG (4.4.2)	ACCEPT (4.4.3)	
			UNIT/ SUBSYS	SUBSYS INTEG				
PARA.NO.	TITLE							
3.1.1.2	NETWORK COMPONENTS -INCLUDE CATEGORIES OF COMPONENTS							TITLE
								DESCR
3.1.1.2.1	PACKET SWITCHES -LOCATED AT EACH NODE -PROVIDE PORTS IAW APPENDIX III -PERFORM X.25 ACCESS FUNCTIONS -PERFORM ADDRESSING IAW CCITT X.121 -PERFORM DATA TRANSFER FUNCTIONS	X	X	X	X	X	D	TITLE
		X	X	X	X	X	D	
		X	X	X	X	X	D	
		X	X	X	X	X	D	
		X	X	X	X	X	D	
3.1.1.2.2	NETWORK CONTROL CENTERS -INCLUDE TWO OPERATIONAL NCC's -PERFORM CENTRALIZED FUNCTIONS -INCLUDE ALL REQUIREMENTS FOR NCO's AND SCO's -INCLUDE COLOR VIDEO DISPLAYS, DATA/COMMAND ENTRY DEVICES, AUXILIARY DATA STORAGE DEVICES, PRINTERS, DISPLAYS, AND ALARMS -EITHER NCC's DESIGNATED PRIMARY -BACKUP NCC's ASSUME PRIMARY ROLE -PROVIDE SERVICE AND NETWORK CONTROL -RECEIVE CONTROL DATA FROM NETWORK SWITCHES AND COMPONENTS -PROVIDE TWO ADDITIONAL NCC's a) ONE NCC PROVIDED AT THE FAA ACT IAW 3.7.7.1.1	X	X	X	X	X	D	TITLE
		X	X	X	X	X	D	
		X	X	X	X	X	D	
		X	X	X	X	X	D	
		X	X	I	X	X	D	
		X	X	T	T	X	D	
		X	X	T	T	X	D	
		X	X	T	T	X	D	
		X	X	T	T	X	D	
		X	X	D	D	X	D	
		X	X	D	D	X	D	

VERIFICATION METHODS: T=TEST, I=INSPECTION, D=DEMONSTRATION, A=ANALYSIS, V=VALIDATION OF RECORDS,
 X=NOT APPLICABLE, L=VERIFIED BY LOWER REQUIREMENT, TITLE=TITLE,
 DEFIN=DEFINITION, DESCR=DESCRIPTION

c. Project Specification Verification Requirements Traceability Matrix (VRTM)
Example from Data Link Processor (DLP) Specification FAA-E-2794.

Paragraph	Paragraph Name	Method
3.	REQUIREMENTS	
3.1	WCP Hardware and System Support Software Definition	-
3.1.1	Interface Definition	-
3.1.1.1	Mode S Interface	I,D,T
3.1.1.2	NADIN II Interface	I,D,T
3.1.1.3	Remote Maintenance Monitoring System (RMMS) Interface	I,D,T
3.1.1.4	Reference Time Source Interface	I,D,T
3.1.1.5	CRT Terminal Interface	I,T
3.1.1.6	Printer Interface	I,T
3.1.1.7	Spare Interface Ports	I
3.1.2	Components List	I
3.1.2.1	Operational Configuration A - Hardware Requirements	-
3.1.2.1.1	Application Processor(s) Requirements	D
3.1.2.1.2	Application Memory Requirements	D
3.1.2.1.3	Mass Storage Requirements	D
3.1.2.1.4	Magnetic Tape Requirements	I,D
3.1.2.1.5	Communications Interface Requirements	D
3.1.2.1.6	Real Time Clock Requirements	D
3.1.2.1.7	CRT Terminal Requirements	I,D
3.1.2.1.8	Printer Requirements	I,D
3.1.2.1.9	Cable and Connector Requirements	D
3.1.2.1.10	Furniture Requirements	I
3.1.2.1.11	Reference Time Source Requirements	D
3.1.2.2	Support Configuration A - Hardware Requirements	-
3.1.2.2.1	Support System Application Memory Requirements	D
3.1.2.2.2	Support System Mass Storage Requirements	D
3.1.2.2.3	Support System CRT Terminal Requirements	D
3.1.2.2.4	Support System Printer Requirements	I,D
3.1.2.2.5	Support System Furniture Requirements	I
3.1.2.3	Operational Configuration B - Hardware Requirements	-
3.1.2.3.1	Application Processor(s) Requirements	D
3.1.2.3.2	Application Memory Requirements	D
3.1.2.3.3	Mass Storage Requirements	D
3.1.2.3.4	Magnetic Tape Requirements	I,D
3.1.2.3.5	Communications Interface Requirements	D
3.1.2.3.6	Real Time Clock Requirements	D
3.1.2.3.7	CRT Terminal Requirements	I,D
3.1.2.3.8	Printer Requirements	I,D
3.1.2.3.9	Cable and Connector Requirements	D
3.1.2.3.10	Furniture Requirements	I
3.1.2.3.11	Reference Time Source Requirements	D
3.1.2.4	Support Configuration B - Hardware Requirements	-
3.1.2.4.1	Support System Application Memory Requirements	D
3.1.2.4.2	Support System CRT Terminal Requirements	I,D
3.1.2.4.3	Support System Printer Requirements	I,D
3.1.2.4.4	Support System Furniture Requirements	I
3.1.3	System Support Software	I,D
3.1.3.1	Operating System	T
3.1.3.2	CCITT X.25 Communications Software/Firmware	T
3.1.3.3	LAPB Communications Software/Firmware	T
3.1.3.4	ANSI Standard X3.28 Communications Software	T

d. Modification of Project Specification FAA-E-2794 (Data Link Processor (DLP))
Verification Requirements Traceability Matrix (VRTM) After Contractor Negotiations.
Inclusion in Statement of Work (SOW) at Contract Award

FAA-E-2794 Paragraph Number	FAA-E-2794 Paragraph Name	Qualifications Test	Factory Acceptance Test	Site Acceptance Test
3.	REQUIREMENTS	-	-	-
3.1	WCP Hardware and System Support Software Definition	A,D,T	D	D ⁽¹⁾
3.1.1	Interface Definition	-	-	-
3.1.1.1	Mode S Interface	I,D,T	I,D	I ⁽¹⁾
3.1.1.2	NADIN II Interface	I,D,T	I,D	I ⁽¹⁾
3.1.1.3	Remote Maintenance Monitoring System (RMMS) Interface	I,D,T	I,D	I ⁽¹⁾
3.1.1.4	Reference Time Source Interface	I,D,T	I,D	I ⁽¹⁾
3.1.1.5	CRT Terminal Interface	I,T	I,D	I ⁽¹⁾
3.1.1.6	Printer Interface	I,T	I,D	I ⁽¹⁾
3.1.1.7	Spare Interface Ports	I,T	I,D	I ⁽¹⁾
3.1.2	Components List	I	I	I ⁽¹⁾
3.1.2.1	Operational Configuration A - Hardware Requirements	-	-	-
3.1.2.1.1	Application Processor(s) Requirements	D	I	I ⁽²⁾
3.1.2.1.2	Application Memory Requirements	I,D	I,D	I,D ⁽¹⁾
3.1.2.1.3	Mass Storage Requirements	D	I,D	I,D ⁽²⁾
3.1.2.1.4	Magnetic Tape Requirements	I,D	I,D	I,D ⁽²⁾
3.1.2.1.5	Communications Interface Requirements	D	I,D	I,D ⁽²⁾
3.1.2.1.6	Real Time Clock Requirements	I,D,T	I,D	I ⁽²⁾
3.1.2.1.7	CRT Terminal Requirements	I,D	I,D	I,D ⁽¹⁾
3.1.2.1.8	Printer Requirements	I,D	I,D	I,D ⁽¹⁾
3.1.2.1.9	Cable and Connector Requirements	I	I	I ⁽¹⁾
3.1.2.1.10	Reserved (Requirement Deleted)	-	-	-
3.1.2.1.11	Reserved (Requirement Deleted)	-	-	-
3.1.2.2	Support Configuration A - Hardware Requirements	-	-	-
3.1.2.2.1	Support System Application Memory Requirements	-	-	I,D ⁽³⁾
3.1.2.2.2	Support System Mass Storage Requirements	D	I,D	I,D ⁽²⁾
3.1.2.2.3	Support System CRT Terminal Requirements	-	-	I,D ⁽³⁾
3.1.2.2.4	Support System Printer Requirements	-	-	I,D ⁽³⁾
3.1.2.2.5	Reserved (Requirement Deleted)	-	-	-
3.1.2.3	Operational Configuration B - Hardware Requirements	-	-	-
3.1.2.3.1	Application Processor(s) Requirements	D	I	I ⁽²⁾
3.1.2.3.2	Application Memory Requirements	I,D	I,D	I,D ⁽¹⁾
3.1.2.3.3	Mass Storage Requirements	D	I,D	I,D ⁽²⁾
3.1.2.3.4	Magnetic Tape Requirements	I,D	I,D	I,D ⁽²⁾
3.1.2.3.5	Communications Interface Requirements	D	I,D	I,D ⁽²⁾
3.1.2.3.6	Real Time Clock Requirements	I,D,T	I,D	I ⁽²⁾
3.1.2.3.7	CRT Terminal Requirements	I,D	I,D	I,D ⁽¹⁾
3.1.2.3.8	Printer Requirements	I,D	I,D	I,D ⁽¹⁾
3.1.2.3.9	Cable and Connector Requirements	I	I	I ⁽¹⁾
3.1.2.3.10	Reserved (Requirement Deleted)	-	-	-
3.1.2.3.11	Reserved (Requirement Deleted)	-	-	-
3.1.2.4	Support Configuration B - Hardware Requirements	-	-	-
3.1.2.4.1	Support System Application Memory Requirements	-	-	I,D ⁽³⁾
3.1.2.4.2	Support System CRT Terminal Requirements	-	-	I,D ⁽³⁾
3.1.2.4.3	Support System Printer Requirements	-	-	I,D ⁽³⁾
3.1.2.4.4	Reserved (Requirement Deleted)	-	-	-

⁽¹⁾ Applicable to Operational System - Site Acceptance Test Only

⁽²⁾ Applicable to both the Support System and Operational System - Site Acceptance Tests

⁽³⁾ Applicable to Support System - Site Acceptance Test Only

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3. FAA MASTER TEST PLAN (MTP) VERIFICATION REQUIREMENTS TRACEABILITY MATRIX (VRTM).

The APMT through PD's between the PM and FAA users will bring experienced field personnel to help develop the FAA MTP VRTM. Using the NAS-SS-1000 Vol. I System Specification VRTM's and Vol. II-V Subsystem VRTM's allocated to the project the working group will determine:

- a. Which end-state requirements can be satisfied during OT&E Integration testing. To do this, it will be necessary to know the dependent "string" of end-state subsystems for a complete functional requirement to be satisfied and whether these subsystems will be available in the NAS at the time of the project's OT&E Integration test period.
- b. Each requirement not testable because of dependent interface unavailability should be deferred and verification accountability transferred to the dependent subsystem when it is fielded.
- c. When a requirement represents an existing NAS functionality the users should help in determining derived OT&E Integration test requirements that prove that existing functionality has not been degraded.
- d. When new functionality is brought to the NAS by the project, derived OT&E test requirements will be determined after the contractor's PDR and CDR. These requirements and schedule assessments may require updates to the MTP.

FAA MASTER TEST PLAN VERIFICATION REQUIREMENTS TRACEABILITY MATRIX

4. EXAMPLE OF FAA MASTER TEST PLAN (MTP) VERIFICATION REQUIREMENTS TRACEABILITY MATRIX (VRTM).a. FAA Master Test Plan (MTP) System and Subsystem Verification Requirements Traceability Matrix (VRTM) Example from Maintenance Data Terminal (MDT) ProjectMAINTENANCE DATA TERMINAL (MDT) MASTER TEST PLAN (MTP) - SYSTEM
VERIFICATION REQUIREMENTS TRACEABILITY MATRIX (VRTM)

SECTION 3 REQUIREMENTS PARAGRAPH REFERENCE FOR DOCUMENT NAS-SS-1000 VOL I		VERIFICATION LEVEL AND METHOD			TEST PLAN IMPLEMENTATION		
PARA.NO.	TITLE	SUBSYS LEVEL	INTEG LEVEL	SITE LEVEL	OT&E INTEG	OT&E SHAKEDN	QUAL TEST
3.2.1.1.9.1.A.	CONTINUALLY MONITOR SUBSYSTEMS	X	D	X	D	D	
3.2.1.1.9.1.B	STATUS AND ALARMS	X	D	X	D	D	
3.2.1.1.9.1.C	ON-SITE, OFF-SITE CONTROL	X	X	X	D	D	
3.2.1.1.9.1.G	SPECIALIST ACCESS TO SUBSYSTEM	X	D	D	D	D	
3.2.1.2.9.A	CONTINUALLY MONITOR S/S STATUS/ALARM	X	T	X			Q
3.2.1.2.9.D	DEVELOP AND PRESENT REQUESTED DATA	X	T	X			Q
3.2.1.2.9.E	ACKNOWLEDGEMENT OF COMMANDS	X	T	X			Q
3.3.7	HUMAN PERF/HUMAN ENGINEERING	I	I	X		D	
3.3.7.1	HUMAN ERROR CONTROL	I	X	X		D	
3.3.7.2	ANTHROPOMETRIC STANDARDS	I	X	X		D	

VERIFICATION METHODS: T=TEST, D=DEMONSTRATION, A=ANALYSIS, I=INSPECTION, L=VERIFIED BY LOWER LAYER RQMT,
X=NOT APPLICABLE

TEST PLAN IMPLEMENTATION: Q=DEFERRED QUALIFICATION REQUIREMENTS (DOES NOT EXIST IN NAS RMM AT THIS TIME)
P=PREVIOUSLY QUALIFIED (EXISTS IN NAS RMM BUT WILL NOT BE RE-DEMONSTRATED WITH THIS MOD)

MAINTENANCE DATA TERMINAL (MDT) MASTER TEST PLAN (MTP) - SUBSYSTEM
VERIFICATION REQUIREMENTS TRACEABILITY MATRIX (VRTM)

SECTION 3 REQUIREMENTS PARAGRAPH REFERENCE FOR DOCUMENT NAS-SS-1000 VOL V		VERIFICATION LEVEL AND METHOD			TEST PLAN IMPLEMENTATION		
PARA.NO.	TITLE	SUBSYS LEVEL	INTEG LEVEL	SITE LEVEL	OT&E INTEG	OT&E SHAKEDN	QUAL TEST
3.2.1.1.4.1.25	DATA DISPLAY	D	D	X	D	D	
3.2.1.1.7.1.1	DATA ENTRY	D	D	X	D	D	
3.2.1.1.7.1.2	DATA RETRIEVAL	D	D	X	D	D	
3.2.1.1.7.1.3	SOFTWARE	D	X	X	D	D	
3.2.1.1.7.1.4	MENU	D	X	X			Q
3.2.1.1.7.1.5	DATA RETENTION	D	X	X			Q
3.2.1.1.7.1.6	PERIPHERALS	D	X	X	D	D	
3.2.1.1.7.2	PERFORMANCE CHARACTERISTICS	D	X	X			Q

VERIFICATION METHODS: T=TEST, D=DEMONSTRATION, A=ANALYSIS, I=INSPECTION, L=VERIFIED BY LOWER LAYER RQMT,
X=NOT APPLICABLE

TEST PLAN IMPLEMENTATION: Q=DEFERRED QUALIFICATION REQUIREMENTS (DOES NOT EXIST IN NAS RMM AT THIS TIME)
P=PREVIOUSLY QUALIFIED (EXISTS IN NAS RMM BUT WILL NOT BE RE-DEMONSTRATED WITH THIS MOD)

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b. Generic Form for NAS-SS-1000 VRTM - System Engineering will provide NAS-SS-1000 requirements for inclusion in the FAA MTP. The "OT&E INTEG" column will be duplicated from that indicated in the "INTEG" column which reflects the NAS-SS-1000 test requirements. The PM after having received the VRTM from system engineering will pass this to the APMT who has the responsibility of test implementation for these requirements. The APMT will determine the feasibility of testing the requirements based on NAS availability of interoperable subsystems at the FAA ACT and Keysite. The APMT will consult with users on determining a potential test methodology for testing the requirement. Requirements that cannot be tested will be listed as deferred in the NAS Qualification Status column by the APMT. Rationale for deferments will be explained in the MTP. The APMT will request that the ASM organization responsible for shakedown, indicate whether any of the VRTM requirements will satisfy OT&E Shakedown objectives and whether they would care to participate in the OT&E Integration testing. These requirements will be indicated in the "OT&E SHAKEDN" column by the ASM organization.

Initial VRTM Prepared By ASE-600

Date: _____
For: _____

APMT "NAS Qual Status" column Prepared By: _____

Date: _____

ASM "OT&E Shakedn" column VRTM Requirement Usage Prepared By: _____

Date: _____

VERIFICATION REQUIREMENTS TRACEABILITY MATRIX (VRTM)

SECTION 3 REQUIREMENTS PARAGRAPH REFERENCE FOR DOCUMENT NAS-SS-1000 VOL _____ SCN _____		VERIFICATION LEVEL AND METHOD			TEST PLAN IMPLEMENTATION		
PARA.NO.	TITLE	SUBSYS LEVEL	INTEG LEVEL	SITE LEVEL	OT&E INTEG	OT&E SHAKEDN	NAS QUAL STATUS

VERIFICATION METHODS & TEST PLAN IMPLEMENTATION: T = TEST D = DEMONSTRATION A = ANALYSIS I = INSPECTION
L = VERIFIED BY LOWER LAYER RQMT X = NOT APPLICABLE
NAS QUALIFICATION STATUS: Q = DEFERRED QUALIFICATION REQUIREMENTS (DOES NOT EXIST IN NAS NOW)
P = PREVIOUSLY QUALIFIED (EXISTS IN NAS BUT WILL NOT BE RE-DEMONSTRATED)
R = PREVIOUSLY QUALIFIED AND WILL BE RE-DEMONSTRATED

PART 7. SELECTED TEST AND EVALUATION INFORMATION

1. Test and Evaluation (T&E) Reference Materials. The following referenced T&E information has been provided for guidance information for the PM and APMT. These paragraphs are subject to change and it should be determined as to whether the information is in the current version of the order.

a. FAA Standards

- | | | |
|------|-------------|--|
| (1) | FAA-STD-005 | Preparation of Specification Documents |
| (2) | FAA-STD-013 | Quality Control Program Requirements |
| (3) | FAA-STD-016 | Quality Control System Requirements |
| (4) | FAA-STD-018 | Computer Software Quality Program Requirements |
| (5) | FAA-STD-019 | Lightning Protection, Grounding, Bonding, and Shielding Requirements for Facilities |
| (6) | FAA-STD-020 | Transient Protection, Grounding, Bonding, and Shielding Requirements for Equipment |
| (7) | FAA-STD-021 | Configuration Management (Contractor Requirements) |
| (8) | FAA-STD-024 | Preparation of Test and Evaluation Documentation |
| (9) | FAA-STD-025 | Preparation of Interface Documentation |
| (10) | FAA-STD-026 | National Airspace System (NAS) Software Development |
| (11) | FAA-STD-029 | Selection and Implementation of Telecommunications Standards |
| (12) | FAA-STD-030 | Preparation of Procurement Request Package |
| (13) | FAA-STD-031 | Preparation of Statement of Work |
| (14) | FAA-STD-032 | Design Standards for National Airspace Physical Facilities |
| (15) | FAA-STD-033 | Design Standards for Energy Management in National Airspace System Physical Facilities |
| (16) | FAA-STD-034 | Instructions for the Preparation of Logistics Support Analysis (LSA) Data |
| (17) | FAA-STD-035 | Commercial Electronic Equipment, Market Research for |
| (18) | FAA-STD-036 | Preparation of Project Implementation Plans |

b. FAA Specifications

- | | | |
|-----|------------|---|
| (1) | FAA-G-1375 | Spare Parts - Peculiar for Electronic, Electrical, and Mechanical Equipment |
| (2) | FAA-G-1210 | Provisioning Technical Documentation |
| (3) | FAA-G-2100 | Electronic Equipment, General Requirements |
| (4) | FAA-D-2494 | Technical Instruction Book Manuscript: Electronic, Electrical, and Mechanical Equipment, Requirements for Preparation of Manuscript and Production of Books |
| (5) | FAA-E-2754 | Commercial Electronic Equipment, General Requirements |

c. DOT/FAA Orders

- | | |
|------------------------|--|
| (1) DOT Order 4200.9 | Acquisition Review and Approval |
| (2) DOT Order 4200.11 | Source Selection |
| (3) DOT Order 4200.14 | Major Systems Acquisition Review and Approval |
| (4) FAA Order 1320.10 | FAA Directives System |
| (5) FAA Order 1320.48 | Engineering Field Support Sector Maintenance
Program Procedures |
| (6) FAA Order 1810.1 | Major Acquisitions |
| (7) FAA Order 1810.2 | Independent Operational Test and Evaluation
for Major Systems Acquisition |
| (8) FAA Order 4400.45 | Agency Policy on F&E National Turnkey
Contracts |
| (9) FAA Order 4400.6 | Evaluation of Solicited Technical Proposals |
| (10) FAA Order 4405.10 | Source Selection |
| (11) FAA Order 4630.8 | Quality Assurance Policy |
| (12) FAA Order 4441.9 | Practices Concerning Leased
Telecommunications and Reporting Equipment |
| (13) FAA Order 5280.5 | Airports Certification Program Handbook |
| (14) FAA Order 6000.30 | Policy for Maintenance of the NAS |
| (15) FAA Order 6000.32 | Security Requirements for Remote Access of NAS
Facilities |
| (16) FAA Order 6030.45 | Facility Reference Data File |
| (17) FAA Order 6350.12 | Subsystem Integration Test Procedures |
| (18) FAA Order 1600.54 | FAA Automated Information Systems Security
Handbook |
| (19) FAA Order 1800.63 | NAS Deployment Readiness Review (DRR) Program |
| (20) FAA Order 6030.32 | Maintenance of NAS Equipment Under Test |
| (21) FAA Order 6040.6 | AF Technical Inspection Program |
| (22) FAA Order 6200.4 | Test Equipment Management Handbook |
| (23) FAA Order 1100.5 | FAA Organization Field |
| (24) FAA Order 1800.8 | NAS Configuration Management |
| (25) FAA Order 6090.10 | Development and Implementation of Remote
Monitoring Subsystems (RMS) within the
National Airspace System (NAS) |
| (26) FAA Order 1800.14 | Airways Facilities Evaluation System |

d. OMB/DOD Documents

- | | |
|------------------------|--|
| (1) OMB Circular A-109 | Major System Acquisition includes OFPP
Pamphlet Discussion of the application of
OMB Circular A-109. |
|------------------------|--|

(2) DID's for 2167	Data Item Descriptions
(3) DOD-STD-2167	Defense System Software Development
(4) DOD Directive 5000.1	Major System Acquisitions
(5) DOD Instructions 5000.2	Major System Acquisition Procedures
(6) DOD Directive 5000.3	Test and Evaluation
(7) MIL-STD-461	Electromagnetic Emission and Susceptibility Requirements for the Control of Electromagnetic Interference
(8) MIL-STD-483	Configuration Management Practices for Systems Equipment, Monitors and Computer Programs
(9) MIL-STD-490	Specification Practices
(10) MIL-STD-462	Electromagnetic Interference Characteristics, Measurement of
(11) MIL-STD-469	Radar Engineering Design Requirements
(12) MIL-STD-1521	Electromagnetic Compatibility
(13) MIL-STD-2165	Technical Reviews and Audits for Systems, Equipments, and Computer Software
(14) MIL-STD-4562	Testability Program for Electronic Systems and Equipments
(15) MIL-A-8806	Calibration Systems Requirements
(16) MIL-I-45208	Acoustical Noise Level in Aircraft, General Specification for Inspection System Requirements

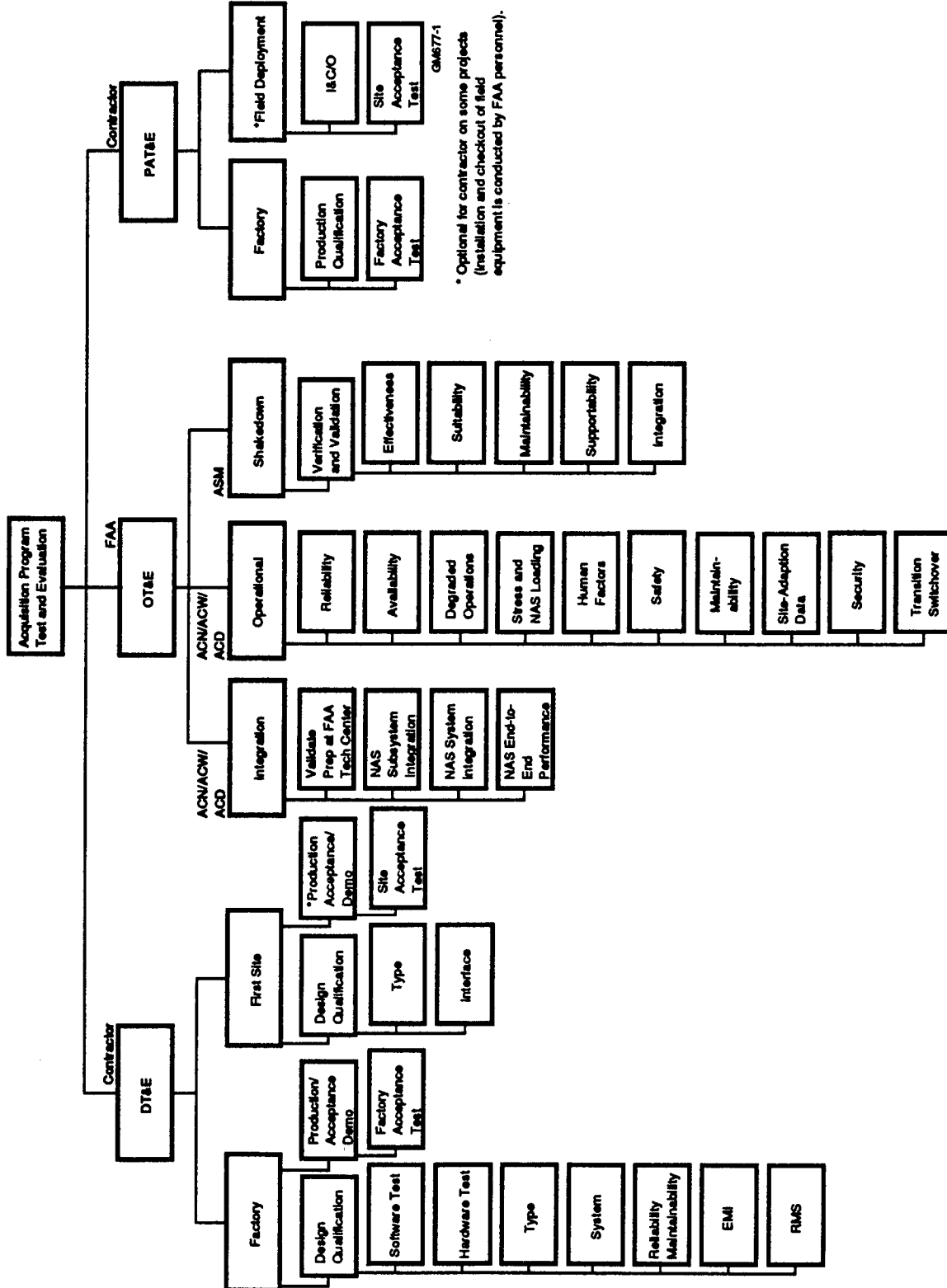
e. Additional Documents

(1) NAS-MD-110	T&E Terms and Definitions
(2) NAS-MD-001	NAS Configuration Management Document
(3) NAS-MD-790	RMMS Interface Control Document
(4) NAS-MD-792	Operational Requirements for RMMS
(5) NAS-MD-793	RMS Functional Requirements
(6) NAS-MD-794	Functional/Operational Requirements for the MCC
(7) NAS-SR-1000	NAS System Requirements Specification
(8) NAS-DD-1000	NAS System Specification - Level I Design
(9) NAS-SS-1000 Volume I	NAS System Specification Volume I NAS Functional and Performance System Requirements and Allocation Tables
(10) NAS-SS-1000 Volumes II - VI	NAS System Specification Volume II through Volume VI Functional and Performance Requirements for the Subsystems and NAS Facilities

f. Other Test and Evaluation (T&E) Documentation. Other test and evaluation standards, practices, and policies, submitted by TPRC members and formally adopted by the TPRC.

g. Acquisition Program Test and Evaluation. Figure 7-1, Acquisition Program T&E Components, depicts a checklist of sub-elements that constitute DT&E, OT&E, and PAT&E. The APMT may use this as a guide for tailoring to the individual programs and the T&E phase. Definitions of these sub-elements are contained in NAS-MD-110, T&E Terms and Definitions and part 2 of this appendix.

Figure 7-1 Acquisition Program T&E Components



3. Test Requirement* and Test Objective Examples.

a. Development Test and Evaluation (DT&E) Requirements:

(1) Verify that the transmitter peak power, measured at the power coupler, is a maximum of 1.32 MW.

(2) Verify that the RMS detects an alarm/alert condition, filters extraneous fluctuations, and provides an indication to the local status file within an average time of 2 seconds and a maximum time of 10 seconds.

(3) Verify that the RMS executes control commands (that can cause a state change) received from other RMMS subsystems within an average time of 2 seconds and a maximum time of 5 seconds.

b. Operational Test and Evaluation (OT&E) Shakedown Objectives:

(1) Review software support equipment and documentation to ensure the capability to support fully the Fixed Maintenance Data Terminal (FMDT) and Transportable Maintenance Data Terminal (TMDT) operational requirements from a national level. Review ASM-600 staffing and staff training to ensure adequacy for field support.

(2) This test will verify the ability of the field technician, using the furnished documentation, to configure the MDT and the Tandem 6530 Terminal Emulation Program using the Tandem RS232 interface and to perform Tandem System Management functions, Maintenance Management System functions, and file transfer functions.

c. Operational Test and Evaluation (OT&E) Integration National Airspace System (NAS) System-Level Requirements Examples:

(1) Verify that the NAS terminal area surveillance response time, antenna boresight to display, which include radar surveillance and data, is displayed within 2.2 seconds.

(2) Verify that the NAS en route area surveillance response time, antenna boresight to display, which includes radar surveillance and data, is displayed within 3.0 seconds.

* The detailed test plans/procedures for each test requirement and/or test objective must include a clear statement of the test objective or test requirement, test methodology, test configuration, manning requirements, test success criteria, and data reduction and analysis requirements.

4. Operational Issues and Critical Issues Verification Requirements Traceability Matrix (VRTM) Example for Shakedown Plans, Test Procedures, and Test Scripts.

VERIFICATION REQUIREMENTS TRACEABILITY MATRIX

NAS PROJECT: ILS - RMM

OPERATIONAL SUITABILITY TEST PLAN "B"	OT&E SHAKEDOWN PROCEDURES - BLOCK "C"		BLOCK "D" TEST SCRIPTS
	OPERATIONAL SUITABILITY	CRITICAL ISSUES	
1) Availability-(MTR) 1a) Human Factors and Safety	4.1 e. # 4.1 f.	5.1 e. 5.1 f.	5.1 B. 5.1 F.
2) Reliability -	4.2 a,b	5.2 a,b	5.2 A,B.
3) Maintainability - 3a) Preventive 3b) Corrective 3c) Human Factors and Safety Evaluation form as Attached Appendix	4.1 a,b,c,e,g,h 4.1 d, 4.2 b 4.1 f.	5.1 a,b,c,e,g,h 5.1 d. 5.1 f.	5.1 A,B,C,E,G,H. 5.1 D, 4.2 B. 5.1 F.
4) Compatibility - 4a) Optimization 4b) Adaptation 4c) Human Factors and Safety	4.3 a,b,c,d,e.	5.3 a,b,c,d,e.	5.3 A,B,C,D,E.
5) Transportability -	4.8 a,b.	5.8 a,b.	5.8 A,B.
6) Logistic Supportability -	4.5 a,b,c,d.	5.5 a,b,c,d.	5.5 A,B,C,D.
7) Field Manpower Support For -	4.7 b.	5.7 b.	5.7 B.
8) Technical Support -	4.6 a,b,c.	5.6 a,b,c.	5.6 A,B,C.
9) Security -	4.4 a.	5.4 a.	5.4 A.
10) Training -	4.7 a.	5.7 a.	5.7 A.
11) Transition Switchover -	4.9 a,b,c,d.	5.9 a,b,c,d.	5.9 A,B,C,D.

alphanumerics refer to requirement paragraphs identified in the Shakedown test plan and are designated by two classifications, both of which may be qualitative. However, operational criticality is a discriminator for a more rigid mandate to meet success criteria.

Example of an Operational Test and Evaluation (OT&E) Shakedown Task

TEST TYPE/NUMBER	TEST TITLE	TASK NUMBER
HF 2314	RECOVERY FROM FAILED BIT SYNC PWA	5.2.3.1.4

TEST DESCRIPTION/OBJECTIVE: Recovery from failed BIT SYNC PWA card (address %16-AWP's network) at the FSDPS. This test will check the ability to reconfigure a downed AWP BIT SYNC card coordinating with AWP site.

CRITICAL ISSUES: Procedures (5.1.4), Training (5.1.2), Logistics Support (5.1.5), Labor Intensiveness (5.1.3.1), Documentation (5.1.1)

NOTES: RE: 5.1.5.3 - Will Tandem Computer Corp. available spare parts be compatible with baseline A06 software?

RE: 5.1.1.5 - Check to ensure AUS's have quick reference procedures to facilitate timely recovery i.e., digital/VF patch panel procedures and sufficient patch cords.

EXPECTED RESULTS: To maintain system network communications via backup communications ports and return the failed AWP BIT SYNC card (address %16) to service.

TEST METHOD: This test requires AUS participation. Coordinate all failures with appropriate facilities before testing. The following references may be used to complete this test:

FSDPS/AFSS Operators Manual, E 416-32150, 2.4.2.8/9

Tandem Guardian Operating System Reference Manual, (A06 Version) 82073, Sec. 5, PUP DOWN and UP Commands.

Return to the original system configuration after testing is completed.

6. Example of an OT&E Shakedown Test Evaluation Matrix (STEM) That Can Be Used During Test Script Execution.

SHAKEDOWN TEST: M1FC DATE: _____

TEST PROCEDURES: Recover from failed bit SYNC card at FSDPS. MEETS EXPECTED RESULTS:
YES _____ NO _____

TASK NUMBER: 5.2.3.1.4 OBSERVER _____
(PRINT)

O B S V D	EVALUATION CRITERIA	D I S C R	REMARKS
	Documentation:		
	Completeness		
	Readability		
	Correctness		
	Update Proc.		
	Quick Refer.		
	Training:		
	Timeliness		
	Hands-On		
	Academics		
	Human Factors:		
	Labor-Intense		
	Procedures:		
	Complexity		
	Workability		
	Timeliness		
	Logistics Support:		
	Expediency		
	Turn Around		
	Compatibility		

* All failures/discrepancies require explanation in Remarks column.

SIGNATURE _____

7. Example of an Operational Test and Evaluation (OT&E) Shakedown Human Factors Checklist that Can Be Used During Test Script Conduct.

SAFETY AND HUMAN FACTORS CHECKLIST

SAFETY FACTORS:		MEETS REQUIREMENTS	MINOR EXCEPTIONS	MAJOR EXCEPTION
1.	Warning messages are appropriately displayed.	—	—	—
2.	Protection against shock hazards.	—	—	—
3.	Protection to hot surfaces.	—	—	—
4.	Ease of movement (e.g., weight, balance).	—	—	—
5.	Protection against sharp edges and corners.	—	—	—
6.	Components and wires are easily identified.	—	—	—
7.	Grounding and lightning protection requirements.	—	—	—

REMARKS:

